ELECTRICAL TIMES

6D

888 ft

The largest Babcock & Wilcox travelling grate stokers in operation are 37 feet wide by 22 feet long = 814 sq. ft., eighteen of which are installed in or on order for the Vaal Generating Station, South Africa. Two similar stokers under construction for a Continental Power Station are 2 feet longer, giving a grate area of 888 sq. ft.

BABCOCK & WILCOX LTD.

BABCOCK HOUSE, FARRINGDON STREET
LONDON E.C.4

LOOKING FORWARD TO MEETING YOU

STAND NO. 18

HOTEL & CATERING EXHIBITION

Olympia January 25 - February 3

See the latest Creda heavy duty cooking equipment — modern equipment from a modern factory for modern kitchens

Creda

HEAVY DUTY COOKING EQUIPMENT

MADE BY THE HOUSE OF Simplex

Simplex Electric Company Limited
Oldbury Birmingham and Branches

A TI COMPANY

BACKED BY
THE COMBINED
EXPERIENCE OF
THREE LEADING
ORGANISATIONS

AWCO

ALUMINIUM and ALUMINIUM ALLOY WIRE FOR ELECTRICAL PURPOSES

The increasing scale of application has made it necessary to co-ordinate the technical development, production, stranding and marketing of aluminium and aluminium alloy wire.

To fulfil this need The British Aluminium Company, Ltd., Tube Investments, Ltd., and Hawker Siddeley Group Ltd., combined to launch Aluminium Wire and Cable Co. Ltd., whose products are marketed under the trade name AWCO.

The Company has acquired a completely modern works at Port Tennant, Swansea, with the most up-to-date plant, part of which is already in full production.

Through the combined resources of its three sponsors, Aluminium Wire and Cable Co. Ltd., benefits by an unequalled experience gained over the past 30 years. It is the Company's aim to ensure that users receive the benefit of lowest possible prices consistent with high-quality production. A technical service is available for all who are considering the use of aluminium or aluminium alloy wire for both electrical and non-electrical purposes. Applications should be made to the Sales Office.

AWCO Products include

ROUND WIRE
FLAT WIRE and NARROW STRIP
HOT-ROLLED ROD
SHAPED WIRE
STRANDED CONDUCTORS & CABLE

Overhead Transmission Lines: Steel-cored and plain aluminium conductors in the full range covered by B.S. 215/1934.

OVERHEAD TRANSMISSION LINE FITTINGS and ACCESSORIES

AWCO REG. TRADE MARK

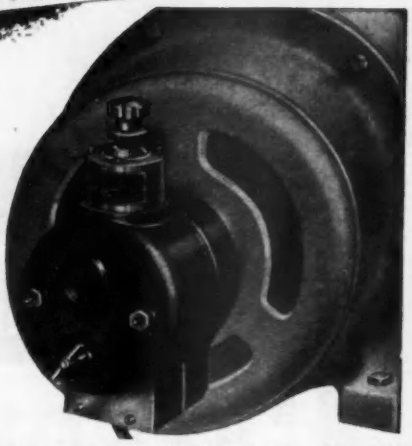
Manufactured by **ALUMINIUM WIRE & CABLE CO. LTD.**
Head Office and Works: PORT TENNANT, SWANSEA, GLAMORGAN.
Sales Office: 10, BUCKINGHAM PLACE, WESTMINSTER, LONDON S.W.1

A

INSTANTANEOUS REACTION!

ISENTHAL

M.S. AUTOMATIC VOLTAGE REGULATOR



Violent load changes . . . temperature fluctuations . . . wide variations of engine speed . . . the ISENTHAL "M.S." Automatic Voltage Regulator responds *immediately* to such conditions and maintains constant voltage with accuracy and reliability. Easily fitted without special experience, the "M.S." Regulator is remarkably simple and inexpensive to install and maintain.

● **For A.C. or D.C. GENERATORS, BOOSTER SETS, STEAM, DIESEL or HYDRO-ELECTRIC GENERATING PLANTS.**

We will gladly supply full details upon request and our technicians are at your disposal for advice upon your problems

ISENTHAL & CO. LTD. Ducon Works, Victoria Road
NORTH ACTON, LONDON, W.3. *Telegrams: Isenthal, London.* *Telephone: ACOrn 3904*

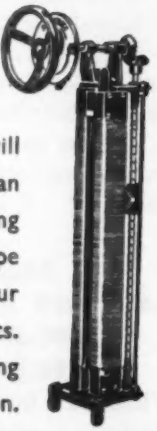
In.1

The
GRUBB
ALL-ELECTRIC
THERMOSTATICALLY CONTROLLED
IMMERSION HEATERS

are fully guaranteed for TWO years. We shall be pleased to quote for your Industrial, Domestic and general heating requirements. Write for trade terms to the sole manufacturers

GRUBB ENGINEERING CO., LTD.
MARY ST., BIRMINGHAM, 12

SLIDING RESISTANCES
for all purposes

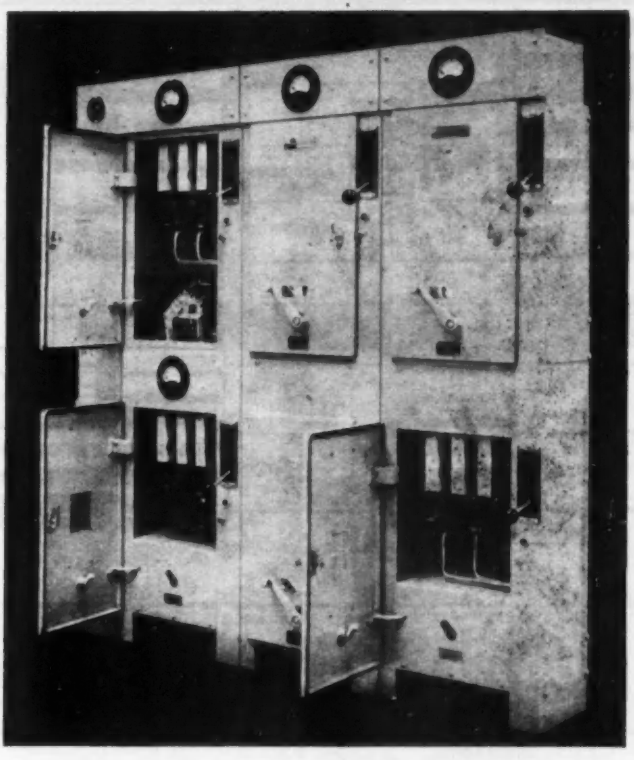


At a price you will approve, CRESSALL can supply you with a Sliding Resistance of the type and size to meet your particular requirements. Make a point of getting in touch with us soon.

CRESSALL
registered Trade Name of—
The CRESSALL MANUFACTURING CO. LTD.
Tower Street, Birmingham 19.
Telephone: ASTon Cross 2666 (3 lines). Telegrams: OHMIC, BIRMINGHAM

BELMOS

POWER DISTRIBUTION SWITCHBOARDS



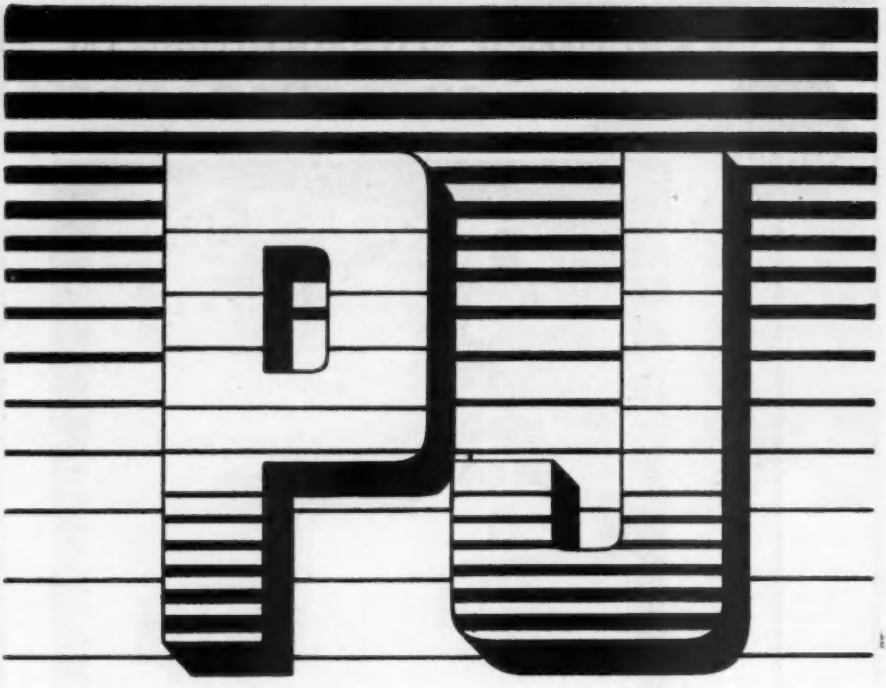
UP TO 200 AMPS 650 VOLTS

FEATURES:

- DOUBLE TIER—SPACE SAVING
- UNIT CONSTRUCTION—READILY EXTENDED
- ISOLATOR INTERLOCKED WITH DOOR
- WITH OR WITHOUT HRC BACK-UP FUSES
- COMPONENT ITEMS OF PROVED ABILITY

THE BELMOS COMPANY LTD.

BELLSHILL • LANARKSHIRE



Steel Sheets for the

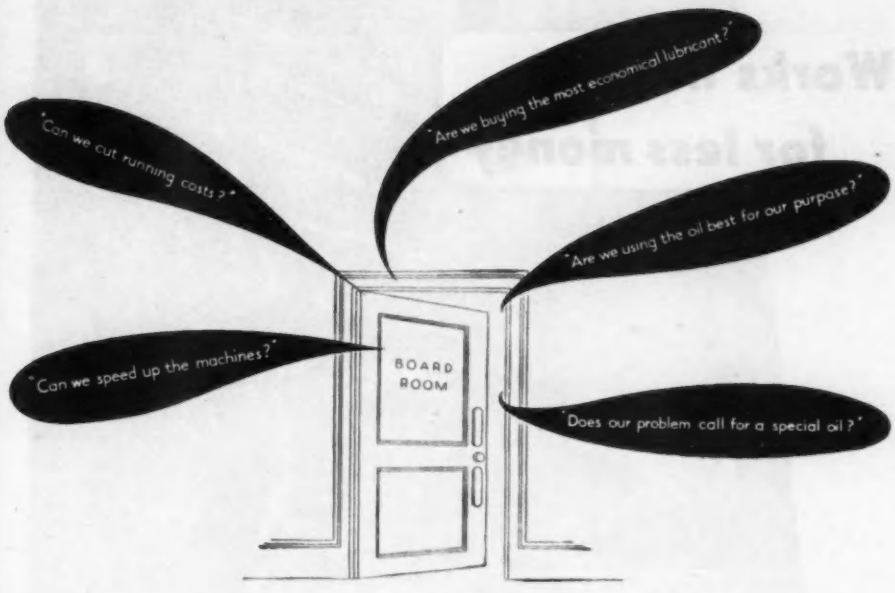
Electrical Industries

PARTRIDGE, JONES & JOHN PATON LTD

PONTNEWYNYDD, NEAR PONTYPOOL

TELEPHONE PONTYPOOL 131/2

15710


"Can we cut running costs?"
"Are we buying the most economical lubricant?"
"Are we using the oil best for our purpose?"
"Can we speed up the machines?"
BOARD ROOM
"Does our problem call for a special oil?"

For the answer to these, and to *all* other oil problems, consult the

WAKEFIELD INDUSTRIAL LUBRICATION SERVICE

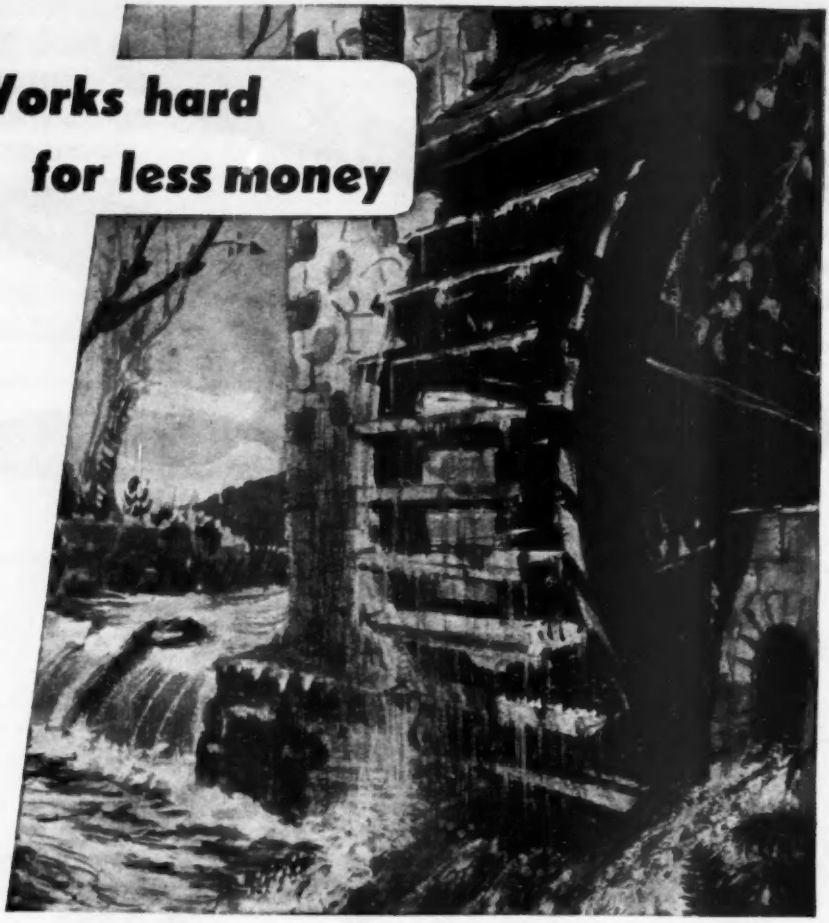
From their experience in solving the problems of many of the largest oil users in industry, the engineers of the Wakefield Industrial Lubrication Service can certainly answer any questions you may have concerning lubrication. The Service is always at your disposal, and a request will bring you a technician qualified to analyse the whole of your problem and to offer constructive advice.

OIL FOR INDUSTRY

C. C. WAKEFIELD AND COMPANY LIMITED · LONDON · W.1

A97E

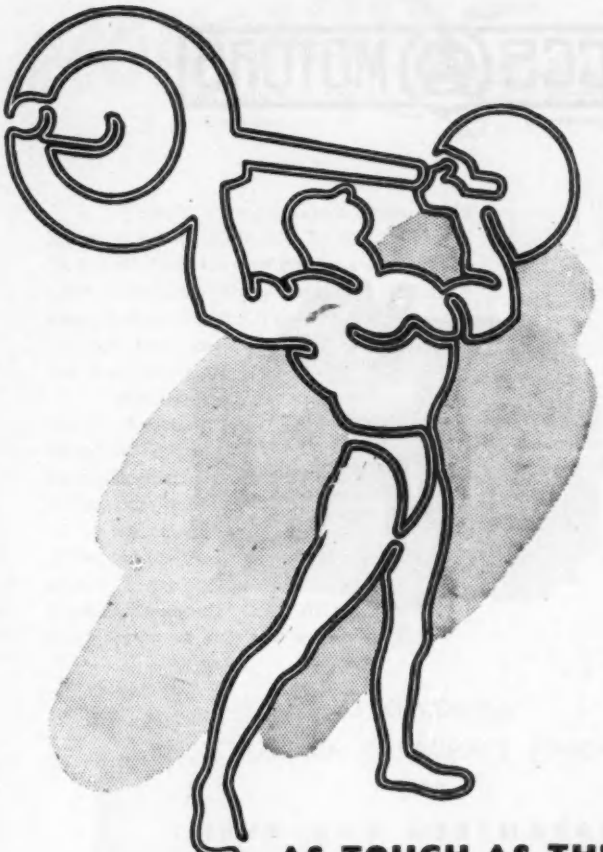
Works hard for less money



Just as the waterwheel continuously provides power yet demands little attention, so the Alklum Steel-Alkaline Battery will give long, trouble-free service, keeping maintenance costs down to a minimum. Compact, strong, and quick to recuperate, the Alklum Battery is built to take rough use and heavy loads.

ALKLUM
STEEL-ALKALINE BATTERY

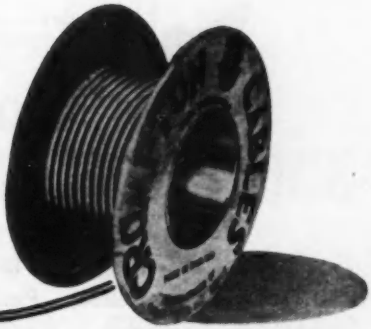
Britannia Batteries Limited · 66 Victoria Street, London, SW1 · Telephone: Victoria 9661-2



AS TOUGH AS THEY MAKE 'EM

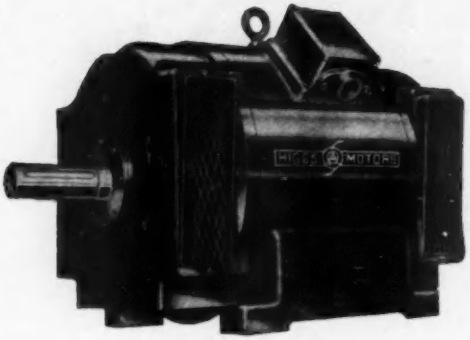
Crompton

T.R.S. CABLE



CROMPTON PARKINSON LIMITED, CROMPTON HOUSE, ALDWYCH, LONDON, W.C. 2
Telephone: CHAncery 3333 *Telegrams: Crompark, Estrand ,London*

HIGGS MOTORS
BIRMINGHAM 6 ENGLAND



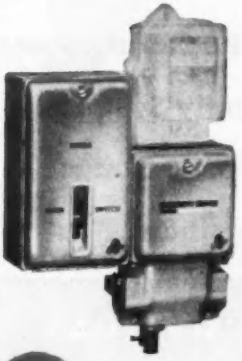
APPROVED BY
CANADIAN STANDARDS ASSOCIATION
AND
GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

ECONOMISE — WITH SAFETY

Here's a two-piece Consumer's Service Unit produced by BICC which is quick and easy to fix in a variety of combinations, thus saving valuable installation time. It is safe and simple in use and permits the addition of further units if necessary.

All the proven advantages of BICC Consumer's Service Units are obtainable in this new model. The combination of the double-pole switch with the sub-circuit fuses requires only two components instead of three. This saves initial cost and storage space. High-breaking capacity fuse-links (Category 250 AC3, B.S.1361), fully protect the six sub-circuits.



Let us send you Publication No. 250P giving further details.

B.I. Callender's

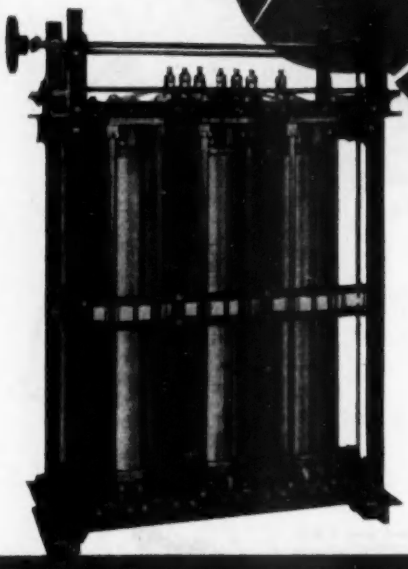
TWO-PIECE CONSUMER'S SERVICE UNIT

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

IDEAL CONTROL

MANUAL
AUTOMATIC
REMOTE

BRECO



of

Electric Furnaces

Electroplating Plants

X-Ray Equipments

Supply Systems

Testing Plants

Rectifiers

"BRECO" ON LOAD VOLTAGE REGULATOR

BRENTFORD TRANSFORMERS LTD.,

BRECO WORKS, KIDBROOKE PARK RD., LONDON, S.E.3

Telephone : LEE GREEN 1006/8

J.&P.

ALUMINIUM SEAMLESS

British Patent Nos. 627815, 627793

SHEATHED CABLES

Easy to get up country

When cables have to be transported to remote situations, the 20% to 70% saving in weight is an even greater factor in favour of J. & P. Aluminium Sheathed Cables—a factor greatly appreciated by overseas users.

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

KEEP YOUR ELECTRICITY COSTS DOWN

by ensuring that you do not exceed your target maximum demand

- Time dial (5 min. resetting).
- Target setting pointer.
- Load pointer.
- Sealing device.

Instal a

FERRANTI

3-Phase

MAXIMUM DEMAND ALARM

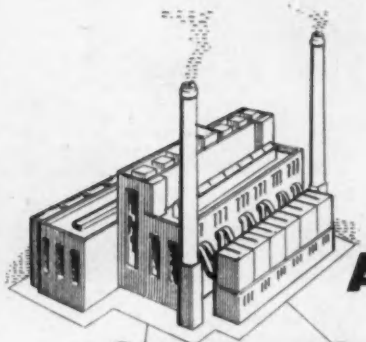
- Advance warning of approaching maximum demand—steps can then be taken to reduce load.
- Load reviewed every five minutes.
- Large clear dial for easy target setting.
- Load pointer and time dial clearly visible.
- Substantial contacts for operating separate warning device.

Please write for List IR.7.

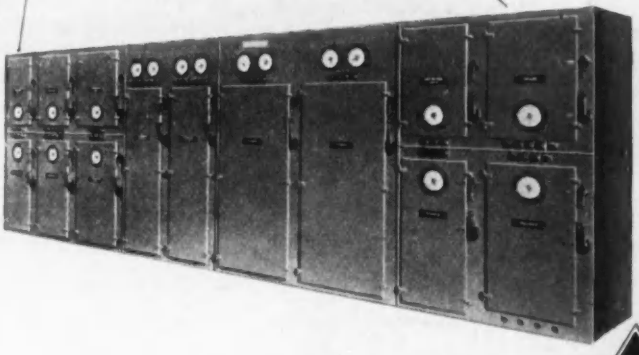
FERRANTI

FERRANTI LTD · HOLLINWOOD · LANCS · LONDON OFFICE: KERN HOUSE · KINGSWAY W.C.2.

F1.74



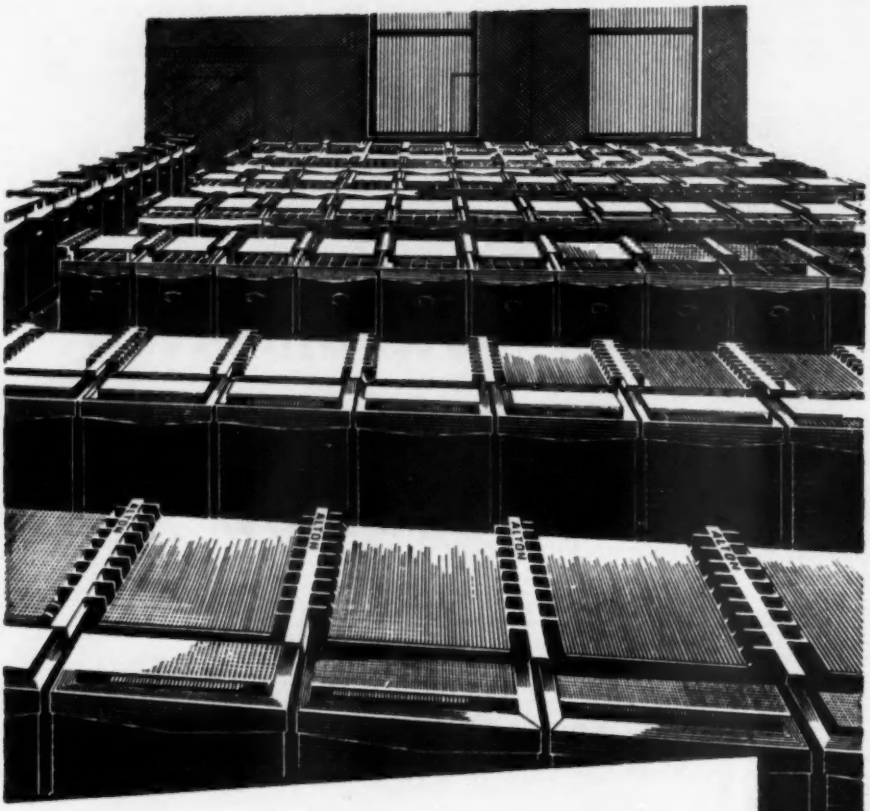
Automatic Control Gear for Power Station Auxiliaries



RELIABILITY COMPACTNESS · HIGH PERFORMANCE

CONTACTOR SWITCHGEAR LTD
WOLVERHAMPTON

Hopwood



Alton has been exporting batteries for thirty years. In installations in sixty-five countries Alton Batteries, in capacities from 10 to 15,000 ampere-hours, are giving the service only good batteries can give. Alton, in any language, means good batteries and firm delivery dates.

ALTON

BATTERIES OF MERIT

THE ALTON BATTERY COMPANY LTD
Alton, Hants. Telephone: Alton 2267 and 2268
Telegrams: Battery, Alton

Alton can also supply renewal plates for all makes of battery, British & Continental

World
renown
STATTER
Switchgear
J. G. STATTER & CO. LTD. 82, VICTORIA STREET, LONDON, S.W.1, Telephone: VICTORIA 0436

Concerning

SPEED COMPARISON

In certain industries, including paper and linoleum manufacture, it is usually essential to be able to adjust and maintain the speed ratios of two or more motors over a range of speed.

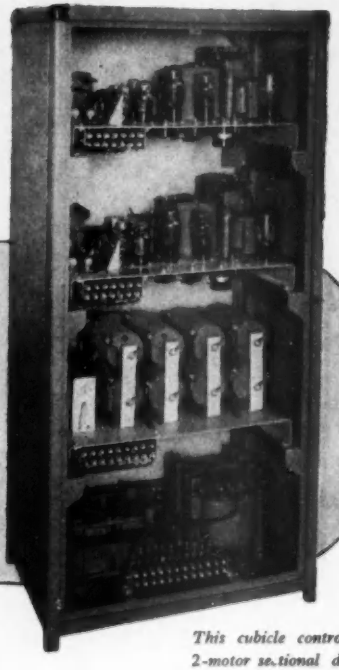
This up-to-the-minute electronic equipment provides accurate control of the relative speed of motors without the use of mechanical gearing.

- Speed ratio adjustment without variable speed gears.
- Ease and accuracy of control.
- Flexibility of siting of control position.
- High Stability.
- Minimum additional equipment located near machines.

METROLOCK

Control Cubicles

The control cubicle complete with 'lift-off' door. Hinged doors can also be supplied.

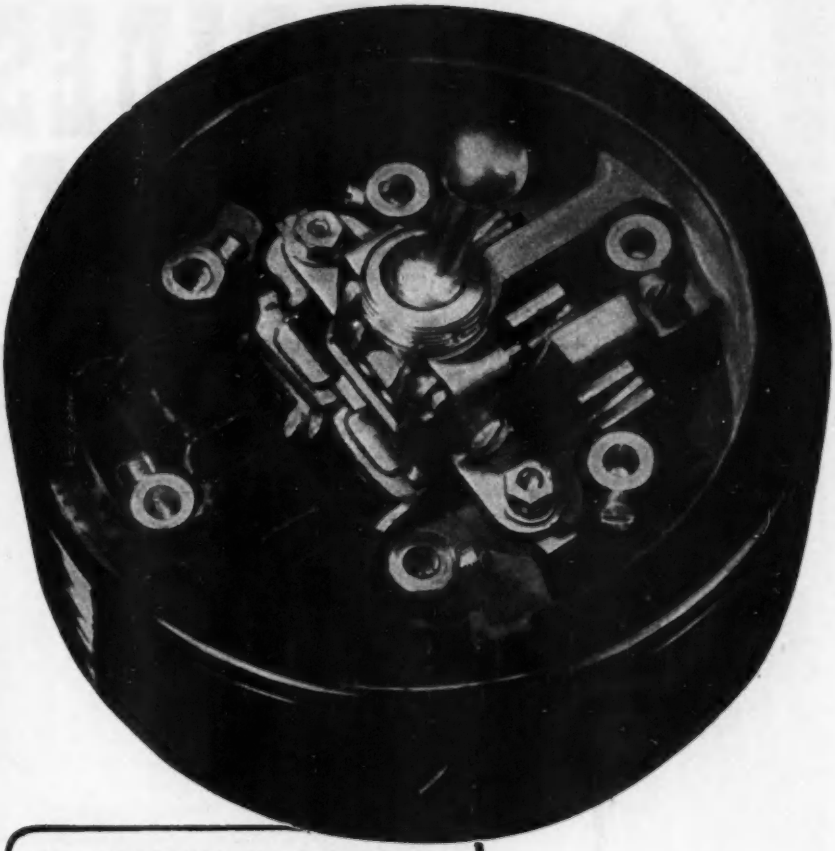


This cubicle controls a 2-motor sectional drive

H/A 903

METROPOLITAN - VICKERS ELECTRICAL CO. LTD.

TRAFFORD PARK, MANCHESTER 17



LUNDBERG

A switch in a thousand!

Lundbergs have developed a range of nearly 1,000 accessory designs which includes practically every kind of switch requirement. Whatever you specify — from the ordinary household switch to the most specialized or modified of designs — we'll bet you a thousand to one you'll find it in the Lundberg list

A P LUNDBERG & SONS LIMITED

CREDENDA WORKS · ROOD END ROAD · OLDBURY · BIRMINGHAM

Stocked and distributed by all branches of SIMPLEX ELECTRIC CO LTD A TI COMPANY

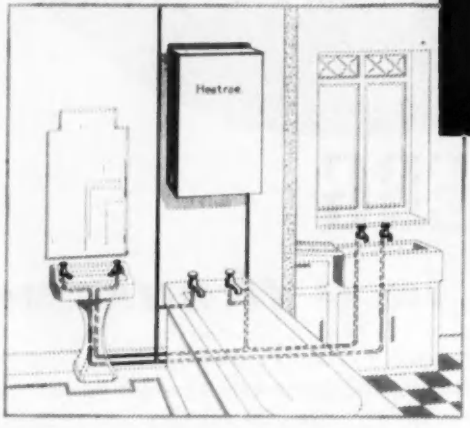
Heatrae OF NORWICH

STRIDES AHEAD

Heatrae—the acknowledged leaders in progressive design, offer this typical example :

The Heatrae Cistern-type JEM Automatic Electrical Water Heater.

A *complete* Hot Water System (comprising ball-valve tank and hot water chamber) and specially developed for use in flats etc., with minimum head room.



This Heatrae Electric Water Heater provides the perfect solution to all problems of restricted space.

● *Write for our leaflet Sec. DEh which gives fullest particulars.*

Heatrae OF NORWICH

HEATRAE LTD · NORWICH · ENGLAND

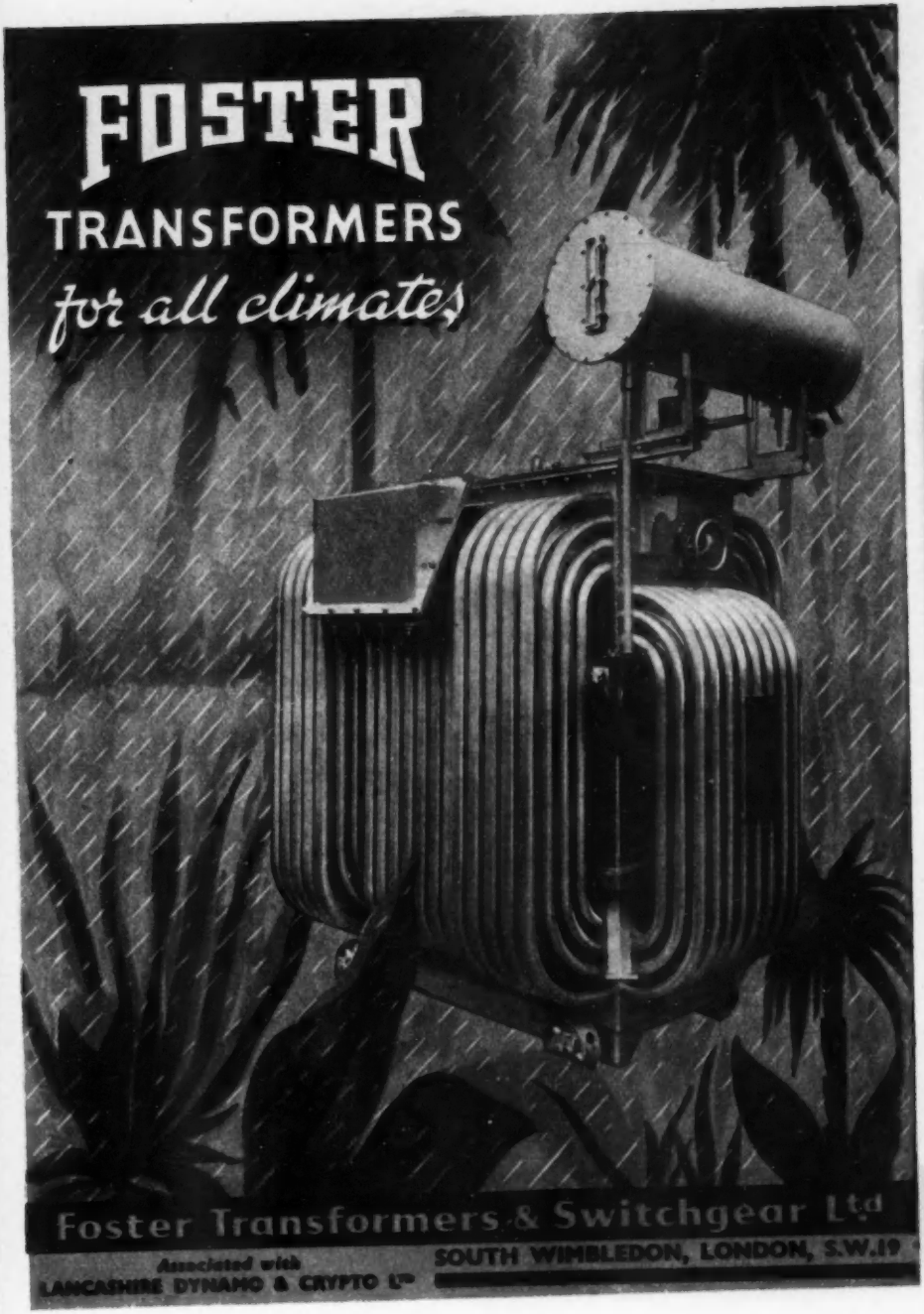
In the export factories, where speed in handling, as surely as speed in production, can write the next few chapters of British history; at the Docks, where the speed of unloading and loading directly affects our day-to-day lives, manpower has an ally. The electric truck, economical, simple, speedy, rugged and easily maintained, is saving time and man-hours where saving counts most. Batteries power these trucks: and the hard worked 'electric's' reputation for freedom from breakdown is a measure of what its battery can take. Chloride Batteries Limited has played an outstanding part in the swing to 'electrics'. Three out of four British electric truck manufacturers fit Exide-Ironclad. Behind each Exide-Ironclad, Chloride and Exide Battery lie the experience and progressive improvements of over 50 years of battery manufacture.

CHLORIDE BATTERIES LIMITED
Exide Works, Clifton Junction near Manchester

The switch will trip when Exide Switch Tripping equipment is installed

P.79

Stirling
AT KINGSTON-UPON-THAMES POWER STATION
THE STIRLING BOILER CO. LTD., 34-36 FARRINGDON ST., LONDON, E.C.4


FOSTER
TRANSFORMERS
for all climates
Foster Transformers & Switchgear Ltd
Associated with
LANCASHIRE DYNAMO & CRYPTO Ltd
SOUTH WIMBLEDON, LONDON, S.W.19

ANNOUNCEMENT

WE ARE PLEASED TO ADVISE
THAT ALL LISTED

'ENGLISH ELECTRIC'

HIGH RUPTURING CAPACITY
NON-DETERIORATING

CARTRIDGE FUSE LINKS

UP TO 300 AMP RATING
(EXCEPTING TYPE 'J')

ARE NOW

AVAILABLE FROM STOCK

TYPE 'J' CARTRIDGE FUSE LINKS AND FUSE LINKS WITH RATINGS ABOVE 300 AMP WILL SHORTLY BE AVAILABLE FROM STOCK

THE ENGLISH ELECTRIC COMPANY LIMITED
FUSEGEAR WORKS — EAST LANCASHIRE ROAD, LIVERPOOL, 10
Works also at STAFFORD · PRESTON · RUGBY · BRADFORD

TEMCO Switches comply with B.S.S. 816 and are made to the same high standard of quality as all TEMCO Accessories. The quick make-and-break undershung action is semi-positive and the spring contacts are self-adjusting. The base is of best quality porcelain, while the dolly and cover are moulded. The dolly has no metal insert. Supplied in surface, semi-recessed and flush patterns in brown on white, all brown, or all white finishes. Switch plates up to four gang in brown or white available for use with flush Switches. Complete Accessory Catalogue available on request.

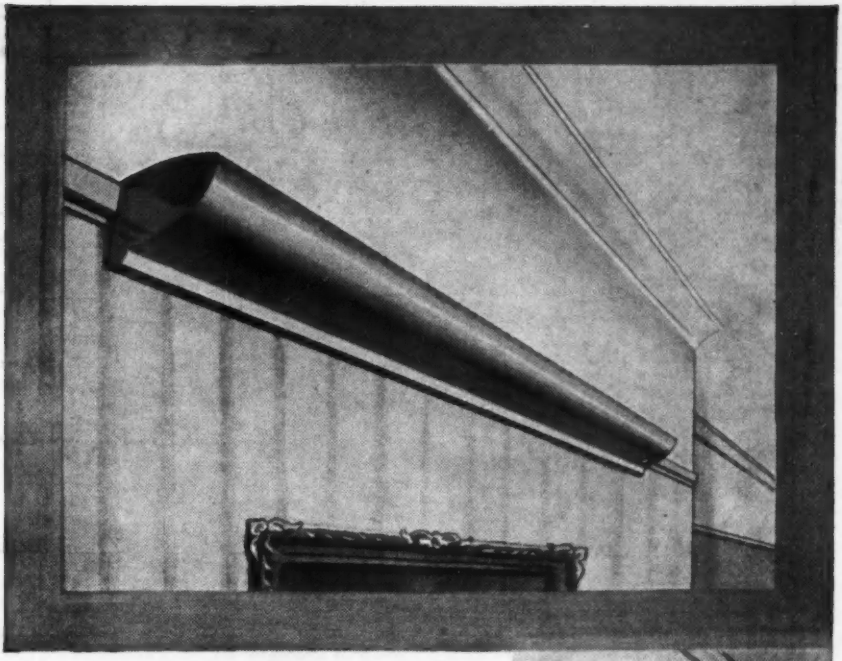
T. M. C.-HARWELL (SALES) LTD

37 UPPER BERKELEY ST., LONDON, W.1 *Telephone:* Paddington 1867-8-9

THE ADMIRAL FINDS ALL SHIP-SHAPE

He knows he can have implicit confidence in C.M.A. cables. The modern battleship contains 1,950 core miles of cable subjected to every extreme of climate. The perfect functioning of these cables is vital.
In C.M.A. cables the Admiral has superb craftsmanship and finest materials.

MAINS CABLE MANUFACTURERS ASSOCIATION
RUBBER & THERMOPLASTIC CABLE MANUFACTURERS ASSOCIATION
Affiliated to
CABLE MAKERS ASSOCIATION
52-54 High Holborn, London, W.C.1. Tel: Holborn 7633

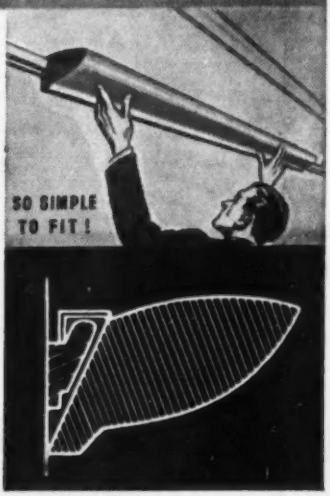


Something entirely new in Fluorescent!

Indirect Cornice Lighting for the Home

THE NEW ATLAS GH/0040 HOME UNIT—ONLY £2-19-0

plus 9/3d. purchase tax



This ATLAS GH/0040 Home Unit is entirely new and revolutionary. It introduces into the average home, at small outlay, the advantages of soft, indirect fluorescent lighting. It has a 4-ft. tube and reflector, ballasts that ensure noiseless functioning, a two-pin glow starter and special suppressor condenser that eliminates interference with radio reception. This fitting weighs only 7½ lb. and is merely hooked on to the picture-rail. To ensure early supplies and take full advantage of the vast new market this ATLAS fitting creates, please communicate with us *now*.

210

ATLAS FLUORESCENT

COMMERCIAL, INDUSTRIAL AND DOMESTIC

THORN ELECTRICAL INDUSTRIES LIMITED, 105-9 JUDD STREET, LONDON, W.C.1. PHONE: EUSTON 1183

C

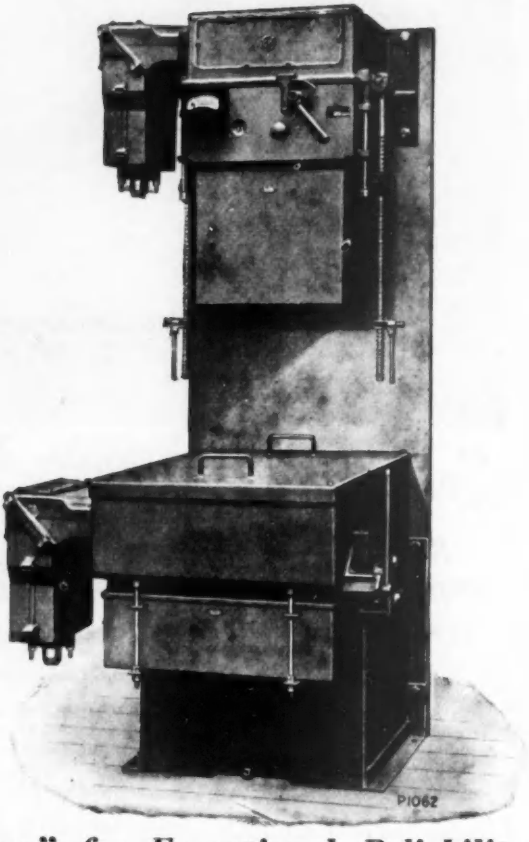
THE QUALITY
we put into our Products
STAYS THERE

THE OUTER SIGN OF
INNER QUALITY

SWITCHGEAR
50 Amps./5,000 Amps.

STARTING GEAR
¼ H.P./5,000 H.P.

Heavy duty type, auto-transformer starter, suitable for controlling motors up to 250 H.P. low tension, or 800 H.P. at 3,300 volts.



Specify "Erskine Heap" for Exceptional Reliability

MAY WE HAVE YOUR ENQUIRIES?

ERSKINE, HEAP & Co LTD

Head Office and Works:
BROUGHTON, MANCHESTER 7

Switchgear Specialists

London Office: GRAND BUILDINGS
TRAFALGAR SQUARE, W.C.2

BRANCH OFFICES AND AGENCIES IN ALL PARTS OF THE WORLD

562 (A)

Whatever the need . . .

SPECIFY STERLING!

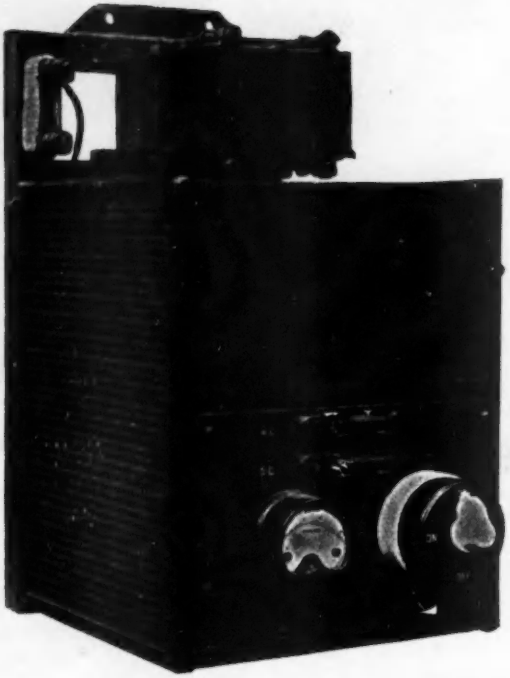
Whatever the need for the generation and supply o electricity it can be met by the Sterling Cable Company. They are the actual manufacturers of the cables, wires and flexibles required. Their products are made from the finest raw materials to fulfil every industrial and domestic application. The Sterling range includes:—Fully tropicalised wires, cables and flexibles; power cables—paper insulated, lead sheathed and armoured power cables—rubber insulated and protected; industrial wiring and trailing cables; house-wiring cables; domestic flexibles; high frequency cables; radio wires and cables; welding cables and automobile cables.

STERLING

Cables of Quality

STERLING CABLE COMPANY LIMITED
ALDERMASTON, BERKSHIRE
Phone: Reading 0080/5
and 1000/1 (P.B.X.)
Cables: Sterling, Reading, England

1929-1949



Twenty years' service and STILL GIVING ITS FULL RATED OUTPUT

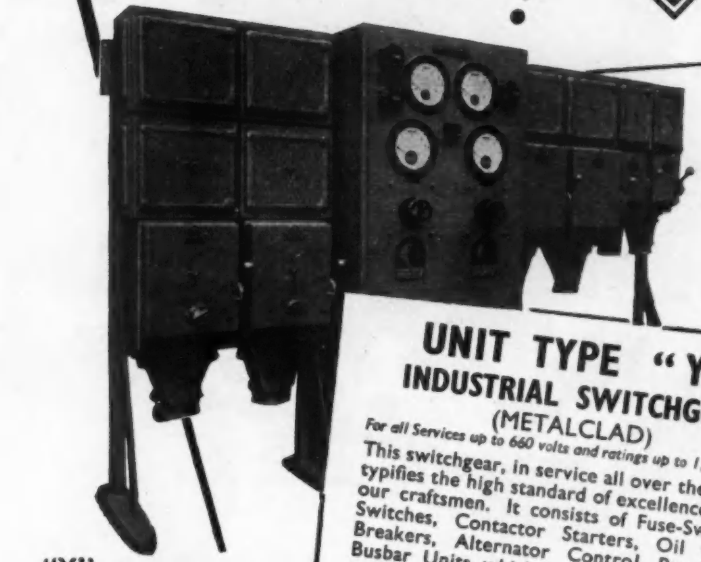
Here is ample proof of the reliability of Westinghouse Metal Rectifiers. This charger was installed in 1929 and has been working constantly ever since on a 110-volts supply.
The customers now require to use it on a 230-volts supply and the set has been sent in for a transformer rewind. The opportunity of testing the rectifiers and the rest of the components was taken, when it was found that everything was up to standard and the set was still giving its full rated output.

WESTINGHOUSE RECTIFIERS

withstand the test of time

Westinghouse Brake and Signal Co. Ltd., 82 York Way, London, N.1

A STANDARD OF EXCELLENCE !



"Y" type Fuse Switchboard for controlling two 40 kW. Alternators having automatic voltage regulator cubicle and metering between incoming and outgoing circuits. Despatched to South America.

UNIT TYPE "Y" INDUSTRIAL SWITCHGEAR (METALCLAD)

For all Services up to 660 volts and ratings up to 1,200 Amps.

This switchgear, in service all over the world, typifies the high standard of excellence set by our craftsmen. It consists of Fuse-Switches, Switches, Contactor Starters, Oil Circuit Breakers, Alternator Control Panels and Busbar Units which, when combined, form a complete switchboard for wall or pedestal mounting. Unit additions are easily carried out and the arrangement achieves the highest degree of flexibility possible.

Write for Catalogue "Y.I."

ELECTRO MECHANICAL MANFG. CO., LTD.

SCARBOROUGH, YORKS.

GRAND BUILDINGS, TRAFALGAR SQUARE, LONDON, W.C.2

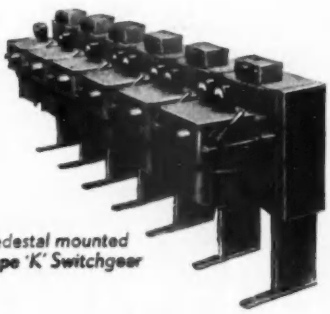
Associated Company of YORKSHIRE SWITCHGEAR & ENG. CO., LTD., LEEDS 6

ELECTRICITY SUPPLY *within the Factory*

LOW VOLTAGE SWITCHGEAR
distributes the supply of electricity throughout the factory.
Reliable switchgear is ESSENTIAL.

FERGUSON PAILIN
INDUSTRIAL TYPE
'K'
SWITCHGEAR

The provision of an adequate and reliable supply of power for plant operation and lighting in new factories, or extensions and modifications to existing plant arrangements should be a first consideration. In addition to their well-known high voltage designs, 'Ferguson Pailin' manufacture a range of fully tested type 'K' low voltage switchgear, for service up to 660 volts and fully conforming with the appropriate British Standard Specification. Units may be of the pedestal or cubicle type arranged for switchboard mounting; wall mounting designs are also available. Full information on this type of switchgear will be gladly sent on request to interested Executives or responsible officials.



Pedestal mounted
Type 'K' Switchgear

FERGUSON PAILIN LIMITED
MANCHESTER, 11 ENGLAND
Switchgear Specialists

Telephone Nos.
MANCHESTER ... (8 lines)
LONDON Temple Bar 8711-2
BIRMINGHAM Edgbaston 1775
GLASGOW Central 5080

NALDERS
INSTRUMENTS

B.S. FIRST GRADE

N.C.S. PRODUCTS include all types of Measuring Instruments, Indicating or Recording, in various patterns and sizes, Switchboard or Portable. Also Protective Relays, Frequency Meters, Vectormeters, Bijou Circuit Breakers, etc., and Flameproof Instruments and Relays.

1. LONG SCALE INDUCTION WATTMETERS for A.C. For use on Single Phase and Polyphase Balanced or Unbalanced load systems with scales marked in Watts, Kilowatts or Megawatts.

2. AMMETERS OR VOLTMETERS for measurements of D.C. and A.C. Round type Hyper-scale Switchboard Instruments, Moving Coil and Moving Iron pattern 1½ in. to 20 in. dia. *Also* Long Scale (300°) Induction pattern from 3½ in. to 20 in. dia.

3. ROTARY SYNCHROSCOPES show whether incoming machine is running above or below synchronous speed, the phase relation of the incomer with respect to the bus-bars, and the exact moment of synchronism. Round Switchboard pattern: 8 in. to 20 in. dia. dial.

The N C S TRADE MARK *Guarantees efficiency*

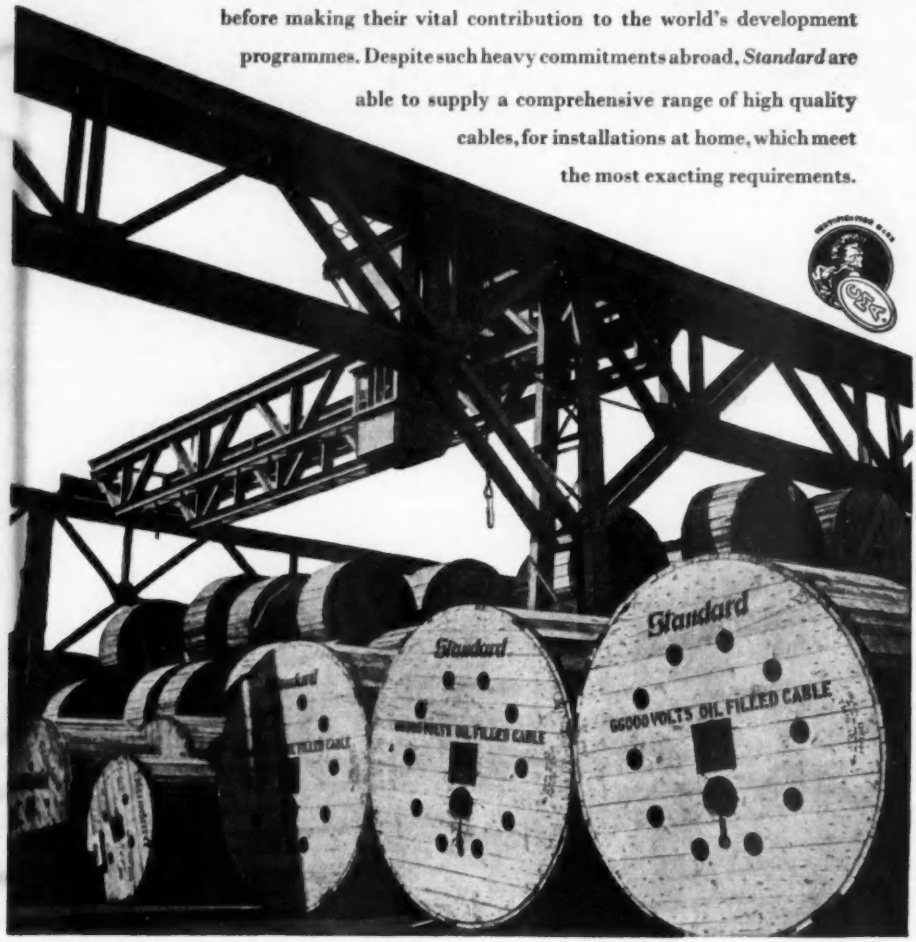
NALDER BROS. & THOMPSON LTD

DALSTON LANE WORKS, LONDON, E.8

Telegrams·OCCLUDE, HACK, LONDON *Telephone*·CLISSOLD 2365 *(3 lines)*

Lifelines to the world

Testifying that "superior craftsmanship" is still one of Britain's greatest assets, *Standard* cables await shipment for export before making their vital contribution to the world's development programmes. Despite such heavy commitments abroad, *Standard* are able to supply a comprehensive range of high quality cables, for installations at home, which meet the most exacting requirements.



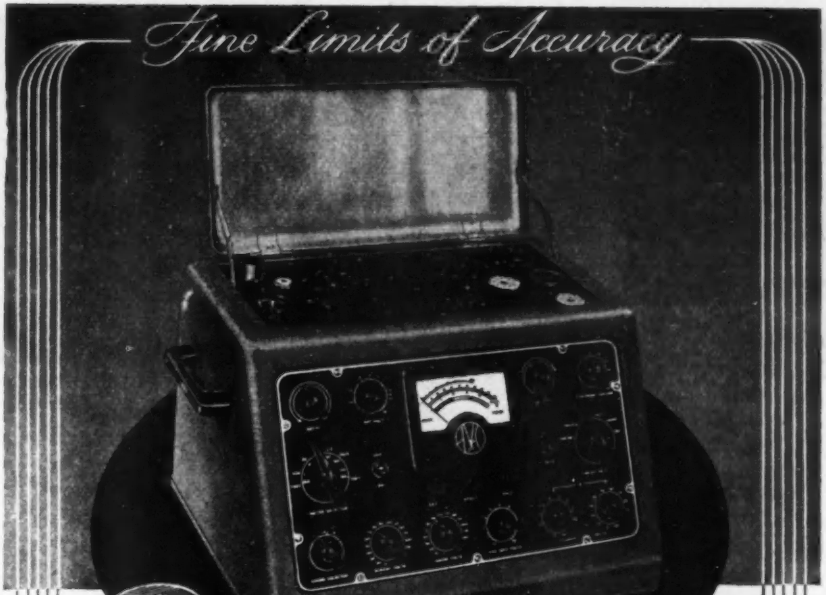
Standard Telephones and Cables Limited

Registered Office: Connaught House, Aldwych, London, W.C.2

POWER LINE DIVISION

NORTH WOOLWICH, LONDON, E.16 *Telephone*: ALBERT DOCK 1401

Fine Limits of Accuracy



AVO

VALVE CHARACTERISTIC METER

A comprehensive instrument built into one compact and convenient case, which will test any standard receiving or small power transmitting valve on any of its normal characteristics under conditions corresponding to any desired set of D.C. electrode voltages. A patented method enables A.C. voltages of suitable magnitude to be used throughout the Tester, thus eliminating the costly regulation problems associated with D.C. testing methods.

A specially developed polarised relay protects the instrument against misuse or incorrect adjustment. This relay also affords a high measure of protection to the valve under test. Successive settings of the Main Selector Switch enable the following to be determined:—

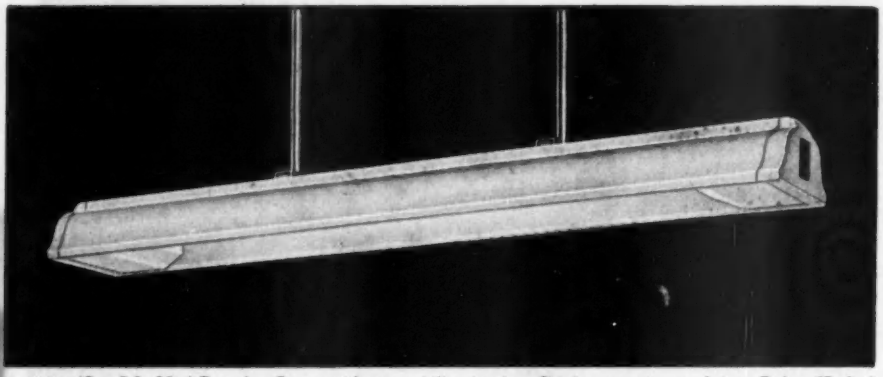
Complete Valve Characteristics including Ia/Vg, Ia/Va, Is/Vg, Is/Va, Amplification Factor, Anode A.C. Resistance, 4 ranges of Mutual Conductance covering mA/V figures up to 25mA/V at bias values up to -100v., together with "Good/Bad" comparison test on coloured scale against rated figures.

"Gas" test for indicating presence and magnitude of grid current. inter-electrode insulation hot and cold directly indicated in megohms, separate cathode-to-heater insulation with valve hot. Tests Rectifying and Signal Diode Valves under reservoir load conditions, and covers all the heater voltages up to 126 volts.

Sole Proprietors and Manufacturers:—
AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD.
Winder House, Douglas Street, London, S.W.1. *'Phone: VICtoria 3404-9*

Avo Precision Electrical Testing Instruments

V.C.1



F 62084 *(One 5 ft. 80w) Trough reflector with upward illumination. Single or continuous fixing.* **Price £5.0.0** *(without gear)*

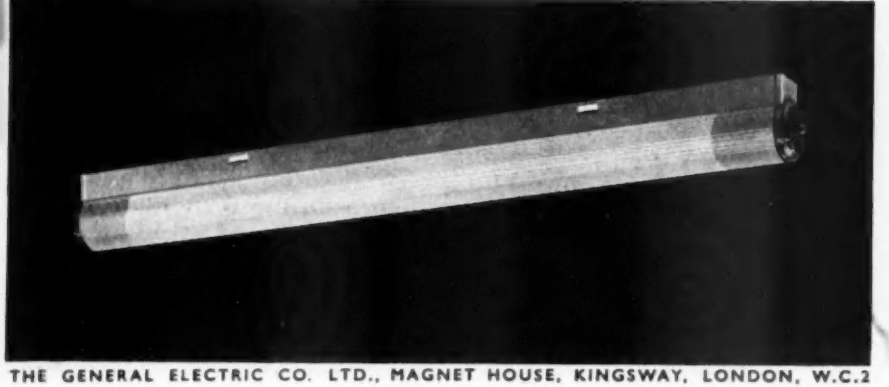
There are over 100 distinctive units

available in the range of

Fluorescent Fittings

by G.E.C.

F 36530 *(One 5 ft. 80w) Decorative fitting in clear reeded "Perspex". Ceiling or pendant fixing.* **Price £8.15.4** *(without gear)*



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

ELECTRICAL TIMES

Vol. 117 No. 3037 THURSDAY, JANUARY 19, 1950

OFFICES—Sardinia House, Sardinia Street, Kingsway, London W.C.2
● *Telephone* : HOLborn 6016-9. ● *Telegrams* : Equivolt, Estrand, London

PUBLISHED EVERY THURSDAY

IN THIS ISSUE . . . .

THE FIRST YEAR 79
THE MINISTER'S REPORT 87
OUR READERS' VIEWS 88
B.E.A. AND FREIGHT CHARGES 88
THE GAS TURBO-ALTERNATOR 89
NEW LITERATURE 94
OVERSEAS NEWS 95
PERSONALITIES IN THE INDUSTRY 97
WATER HEATING BY ELECTRICITY 100
TWO I.E.E. HONOURS 100
PROBLEMS AND PRACTICE IN ENGINEERING . 101
SOME POSSIBLE IMPROVEMENTS *by W. H. Atkinson* 102
THE BUYER'S COLUMN 103
POWER SUPPLY IN DECEMBER 104
THE WEEK IN NEWS 105
Electric Supply News 109
Company Activities 110
COMMERCIAL INFORMATION 111
CLASSIFIED ADVERTISEMENTS *41*
INDEX TO ADVERTISERS *48*

● **SUBSCRIPTION RATES.**—Home and abroad (except Canada) £1 15s. per annum (three years £4 10s.), Canada £1 12s. 10d. (three years £4 2s. 6d.). Pro rata for shorter periods. Subscriptions are payable in advance and may commence at any time. Overseas Subscriptions may be paid by bankers' draft, cheque or international money order.

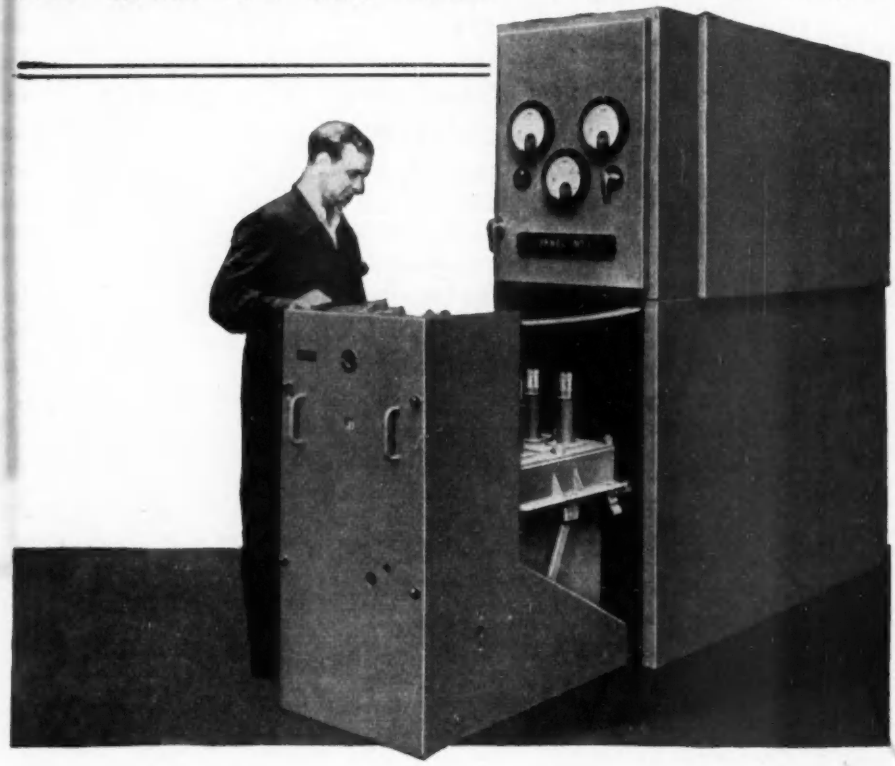
● **CLASSIFIED ADVERTISEMENTS.**—Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice single insertion rate. Fee for our Box No. and postage on replies is 2s. Latest time for receiving Classified Advertisements, 10.0 a.m. on the Tuesday of the week of issue.

FIFTY-NINTH YEAR OF PUBLICATION

G.E.C.

METALCLAD SWITCHGEAR

150 MVA TO 350 MVA • 3·3 kV TO 11 kV



THE GENERAL ELECTRIC CO., LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Volume 117 No. 3037 ELECTRICAL TIMES Thursday, January 19, 1950

EDITORIAL

The B.E.A Report

AS the only industry to show a profit in its first year of nationalisation, and that no less than £4 million, the publication of the B.E.A. Report this week takes on a political aspect which is naturally magnified by the proximity of a General Election. To the industry itself, however, the financial result is no more than one of many major items in a report which must rank as the most significant in the history of electricity supply. Here is recorded the story of the creation of the present vast organisation, the greatest change-over which we have ever seen. Here also are matters of fundamental policy, of engineering development, together with electrical statistics not only of the year under review, but those of the previous year which still lie buried in the archives of the Ministry of Fuel. When, to this report, is attached the fourteen area board reports, our difficulty in reviewing the whole field in a single issue and with severely limited time becomes obvious. In consequence we have concentrated our review this week on the major report, and we shall return to the area reports in our next issue.

Highlights

WITH the widespread activities of a national organisation in its first year of trading activities, the selection of a few highlights cannot convey the full picture. One of the most promising auguries for the future is the increase of no less than half a million consumers. This, no doubt, is due to the continuing low price of electricity. Although the revenue per unit (domestic) has risen to 1·445d., which is 4% above the previous year's figure, it is still 9% less than that for 1938-39. The future of tariffs, however, remains obscure. Although several area boards have announced their future adoption of blocked rate tariffs, the present Report refers to the possibility of retaining the two-part tariff as well as the blocked rate. The fact that no less than 30% of domestic consumers still favour flat rates has also to be kept in mind. On the engineering side, the familiar story of plant difficulties is the principal theme.

With total sales exceeding 39,000 million kWh, the shortage between available plant and demand rose to 531 MW in the winter 1948-9, and even this figure was limited by the mild weather. Had there been extreme cold weather, it is estimated that the shortage would have been 1,730 MW. The report emphasises that the satisfaction of actual and potential demand depends primarily upon expansion of manufacturing capacity—particular stress being laid on boilers and pipework. Significant of the shape of things to come was the realisation that 1,500 MVA is not an adequate rupturing capacity for switchgear in many situations, and that 2,500 MVA or even 3,500 MVA rating is necessary.

How many Amps?

THE report on electrical accidents for 1948, which was reviewed last week, contains tentative suggestions that the supply of information regarding short-circuit values at consumers' terminals should be considered an important part of consumer service. This we heartily endorse. In the past, the direct-fed, high-voltage consumer has been in a happier position in this respect than one taking a supply from the medium voltage network. Most supply

authorities were more alive to the danger of adding weak links to their h.v. network, while faults at consumers' premises connected to the l.v. network tended to be accepted as incidental. Furthermore, it is more difficult to calculate l.v. faults. This is confirmed by a survey of estimated fault currents for domestic consumers given by a number of supply authorities about five years ago, the figures of which showed discrepancies so marked that it was obvious that few authorities really know what value of instantaneous s.c. current the consumer must cater for. More than a year ago we suggested that an *ad hoc* committee should consider this matter and make co-ordinated results more readily available. The present report reinforces the desirability of such a course.

Power from the Sun

RECENT work by the French National Research Centre seems to indicate new possibilities in the utilisation of solar power. Dismissing existing solar plants as expensive in cost and relatively inefficient, owing to the low steam pressures, the problem is attacked from a different angle. Use is made of the nearest practical approach to the "ideal black body" concept of the physicist, consisting of a hollow body with good reflecting properties on its inner surface, and having a small aperture through which the sun's rays are focused from collecting mirrors. Temperatures of 4,000° K. have been produced within the apparatus, and it is considered that this can be adapted to provide very large quantities of heat. It is suggested that higher efficiencies will be obtainable by the use of a modern type of hot-air engine, instead of attempting to use a steam cycle. Since the theoretical energy available in the tropics is estimated at 1 h.p. for 8 hours per 108 sq ft. of sunlit area, there is a suggestion that large tracts of desert could be irrigated and used for food-growing by these means. We feel, however, that there is little future for solar power in this country, in spite of the Ministry of Fuel and Power's estimate that solar energy here is equivalent to 700 tons of coal per acre.

Tea—and a Splash

BEARING in mind the strictures recently passed by coroners on the electric fire as a source of accidents, a report to the Edinburgh Home Safety Committee provides some interesting comparisons. A survey of the causes of accidents to children based on figures supplied by 47 children's hospitals, shows that 5% were due to electric fires. This is the same as that due to children being put into baths which were too hot for them; one-half of the number caused by coal fires; and one-sixth of the number caused by tea being spilt. But we have yet to see the National Tea Council issuing a safety leaflet. One matter which does cause us concern, however, is the number of accidents caused by scalds directly attributable to bad kitchen design. Even in present-day houses, little or no provision has been made for correct working sequence to prevent the necessity for carrying around pans of hot water. Surely the E.D.A. and the E.A.W. have done sufficient work on this subject to make it worth while for architects to study their results—even if they are unfortunate enough to omit all-electric kitchens.

Synthetic Mica

A NEWS message from the U.S.A. states that scientists of the National Bureau of Standards have produced synthetic mica from quartz, magnesite, bauxite, and a fluorosilicate compound used as a crystallising agent. It is known that the Americans have been working on this problem for some time, in fact, since the end of the war. The report does not state, however, whether the U.S. scientists have solved the problem of producing synthetic mica in pieces of any size. It is definitely known in research circles in this country that this was not the case up to a year ago, and the wording of the report states that "it was crystallised successfully," which suggests that this problem is still unsolved. Until synthetic mica can be produced in sizeable sheets its commercial significance will be very small unless the normal channels of supply are disrupted.

Meteor

THE First YEAR

First Report on the Industry under nationalisation records continuing development in commercial and engineering fields

THE first report and statement of accounts of the British Electricity Authority, published this morning, covers the period from August 13, 1947, to March 31, 1949, and runs to well over 300 pages. In addition to introductory and historical sections describing the growth and organisation of the industry from 1882 to 1947, it reviews the work of the B.E.A. under the headings of Administration; Generation and Transmission (subdivided into organisation and operations); Engineering Research; Commercial Operations; Finance and Accounts; Labour Relations; Joint Consultation, Welfare and Training Schemes; concluding with a general summary of the salient features of the report and statements of accounts. There are 46 Appendices, consisting of tables and diagrams grouped under the headings of supply and distribution; generation and transmission, commercial, and administration.

Administration...

The organisation of the industry is explained in some detail, including the relationships between the B.E.A. and the Area Board, and the consultative machinery which enables smooth working to be obtained. It is pointed out that only three Directions have been issued by the B.E.A. to Area Boards, and these have been of a purely formal nature.

Personnel at the end of the year totalled over 155,500, of which 41,000 were employed by B.E.A. and 114,000 by the Area Boards. Broadly speaking, the total is made up of 108,000 manual, 12,500 technical and 35,000 administrative and clerical grades.

The machinery necessary to deal with superannuation and compensation for loss of employment is briefly dealt with. Relationships with other organisations are described, special responsibilities being accepted in respect of certain organisations, such as E.D.A., the E.A.W., and the E.I.B.A. In other cases joint committees were established with manufacturers' associations to consider matters of mutual interest, such as standardisation of equipment. A joint committee of the Authority, the Area Boards and the E.C.A. considered the question of relationships between Area Boards and private contractors.

Other matters of organisation dealt with in this section cover accommodation, library and scientific information services, overseas relations, and a list of public inquiries held.

Engineering...

Continuous steady progress is recorded in the generation and transmission section of the Report. At March 31, 1949, the total installed capacity connected to the Grid was some 12,900 MW and upward of 30,000 MW is estimated to be added to meet requirements over the next twenty years.

The existing plant represented 906 sets of which 291 (10·1% of the total installed capacity) were of 25 or more years of age, while 477 (11·7% of the total installed capacity) were each of less than 8,000 kW rating. Similar conditions applied to the associated boilers.

Plant Shortage

The severity of the plant shortage is indicated by the difference between the new plant planned and that actually brought into operation. Of the 3,051 MW which it was hoped to bring into operation in 1946, 1947 and 1948 it was possible only to commission 1,042 MW, leaving 2,009 MW to be completed later. As a result, in the winter of 1947-48, the deficit at time of maximum potential demand was 1,169 MW, and if there had been no load spreading this would have been in the neighbourhood of 1,650 MW. In the milder winter of 1948-49 the corresponding figure was 521,000 kW. Had the weather been cold, and no load spreading or other alleviating measures introduced, this would have risen to about 1,730 MW.

Although these deficits were mainly due to

the plant shortage resulting from the war, the Report points out that the original programmes planned by the C.E.B., which required manufacturers to increase their productive capacity, were considerably upset by the limitations imposed by the Government's capital investment cuts in 1948. An investigation into the boiler manufacturing and pipe fabrication capacity showed at that time that the allocation to the home market was barely sufficient to allow 1,800,000 kW to be commissioned in one year. (A more recent survey puts this figure at 1,250,000 kW.) Thus it will be essential to continue to use all serviceable plant for the next five years at least, irrespective of age or efficiency; and for several years after, the removal of obsolete plant can only be undertaken on a limited scale.

In this connection it is interesting to note that the percentage capacity of plant out of action in January due to breakdown and other hazards was only 12·1% in 1949 as compared with 18·7% in 1944 and 16·3% in 1946. The Authority however is assuming that a total outage of 15% will be a reasonable figure in assessing plant and load capacity.

Designs and Development

As a result of a survey of the dimensional details of current designs of main plant items, considerable progress was made towards establishing rationalised types of layout for the various categories of station. Special attention was given to the need for economy in capital cost and saving in the use of steel. As a result the unit type of installation in which a single boiler is associated with each turbo-generator is being adopted more extensively.

Following on the standardisation of turbine capacities and steam pressures introduced in 1947 by Ministerial Order, the main technical features of the associated generators were also standardised. Other main items in which rationalisation has been introduced include boiler design and capacity, and pipe sizes. Work was also in progress on rationalisation of condensers, pumps and valves.

The extent to which the standard turbo-alternators are programmed is shown in the table which relates to the plant approved to March 31, 1949, in the four annual programmes 1949-52 inclusive.

TABLE I. STANDARD STEAM PRESSURES

Steam Pressure	Total Capacity of Sets	Capacity of Standard Sets	Standard Sets as Percentage of Total Sets
lb/sq in.	kW I	kW I	%
Up to 400	165,000	—	—
600	1,900,500	1,080,000	57
900	2,770,000	1,920,000	69
Over 900	400,000	—	—
	5,235,500	3,000,000	57

Although this table indicates that a considerable proportion of non-standard machines are included, many of these are duplicates of existing sets and continue developments which were begun before the evolution of the standard machines. Further, to avoid stagnation in design and encourage development a certain amount of plant operating at advanced steam conditions has been included in the plant extension programmes. Three installations of this nature are to operate at a pressure of 1,500 lb/sq in. with a temperature of 1,050° F.

Low Grade Fuels

An investigation was started, in collaboration with the boiler manufacturers, to find ways of utilising the low grade fuels which the Authority is being called upon to use in increasing quantity. Other work is being carried out on the prevention of grit and dust emission, and on thermal-electric generation. Two Committees have issued reports on serious problems, namely, corrosion fatigue in steam pipes and receivers, and boiler availability. This latter Committee, the Boiler Availability

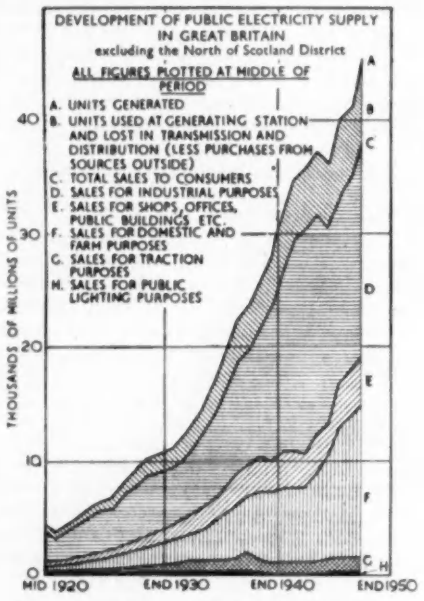

DEVELOPMENT OF PUBLIC ELECTRICITY SUPPLY
IN GREAT BRITAIN
excluding the North of Scotland District
ALL FIGURES PLOTTED AT MIDDLE OF PERIOD
A. UNITS GENERATED
B. UNITS USED AT GENERATING STATION AND LOST IN TRANSMISSION AND DISTRIBUTION (LESS PURCHASES FROM SOURCES OUTSIDE)
C. TOTAL SALES TO CONSUMERS
D. SALES FOR INDUSTRIAL PURPOSES
E. SALES FOR SHOPS, OFFICES, PUBLIC BUILDINGS ETC.
F. SALES FOR DOMESTIC AND FARM PURPOSES
G. SALES FOR TRACTION PURPOSES
H. SALES FOR PUBLIC LIGHTING PURPOSES
THOUSANDS OF MILLIONS OF UNITS
40
30
20
10
0
MID 1920
END 1930
END 1940
END 1950

Fig. 1. Development of public electricity supply

Committee, has been re-established to investigate the low-quality fuel problems mentioned above.

An estimated price of £50 per kilowatt is given as the cost of building power stations projected for 1950-53. In the twelve months from vesting day the total value of generating station capital contracts approved by the Authority in respect of plant to be commissioned in 1952, 1953 and 1954 was about £42 million. This is divided roughly equally between civil engineering and building and the plant.

Engineering.—Lack of manufacturing capacity still remains the major factor in the continuing power shortage. All serviceable plant will be kept in use, regardless of age or relative efficiency, for at least five years. Unit installations are to be adopted more extensively utilising standard machines and associated equipment. Switchgear duty can no longer be kept down to 1,500 MVA and new designs up to 3,500 MVA are required. Average thermal efficiency has risen from 20·86% in March, 1948, to 21·15% in March, 1949, with a corresponding reduction in fuel costs of from 0·4291d. per unit sent out to 0·4098d. per unit sent out.

As far as the Grid is concerned only small extensions were completed in the twelve months following vesting day. These comprised 14·5 miles at 132 kV and 16·5 miles at 66 kV. However, many large extensions in connection with new generating stations have been put in hand since January, 1948. These include provision for 331 route miles of 132 kV lines and 3 route miles of lower voltage lines. The approximate cost of transmission schemes approved in the year will be £11·5 million and contracts have been approved for over £5·75 million.

TABLE 2 AGE OF STEAM-DRIVEN GENERATING SETS

Age at March 31, 1949 Years	M.C.R.				
	Under 8 MW	8 to 16 MW	16 to 32 MW	Over 32 MW	Number of Sets
Under 5	1	3	38	15	57
5-10 ...	6	8	64	16	94
10-20 ...	60	37	63	40	200
20-30 ...	293	84	54	4	435
30-40 ...	69	3	—	—	72
40-50 ...	48	—	—	—	48
TOTAL ...	477	135	219	75	906

On transmission equipment, standardisation of apparatus and testing was proceeding. Switchgear was however proving a difficulty as the fault short-circuit stresses were continually rising and in many places it was not practicable to keep the duty down to 1,500 MVA, and in an increasing number of cases switchgear designed for duties up to 3,500 MVA was required. Investigation was being made into methods of converting existing 1,500 MVA gear to give a breaking capacity of 2,500 MVA.

Faults on the system during the year ended March 31, 1949, were 723 in number of which 92·9% were correctly cleared. Nine 132 kV

TABLE 3. OUTPUT FROM GENERATING STATIONS, 1948-9 GROUPED ACCORDING TO DIVISION
(thousands of units of electricity)

Generation Division	Maximum Output Capacity at March 31, 1949 MW	Generated by		Totals Generated	Used in Stations	Sent Out from Stations
		Steam	Water Power			
London	2,377	9,061,259	—	9,061,377	509,730	8,551,647
South Eastern	508	1,565,751	—	1,574,028	102,029	1,471,999
Southern	396	1,300,408	341	1,305,446	72,091	1,233,355
South Western	488	1,640,080	9,831	1,658,953	98,154	1,560,799
Eastern	559	1,762,727	—	1,767,411	116,542	1,650,869
East Midlands	778	3,021,348	—	3,021,825	167,958	2,853,867
Midlands	1,238	5,047,081	445	5,048,735	337,182	4,711,553
South Wales	551	2,873,866	1,411	2,885,887	187,957	2,697,930
Merseyside and North Wales	585	2,520,470	107,587	2,634,911	153,551	2,481,360
Yorkshire	1,226	5,679,729	670	5,680,580	325,065	5,355,515
North Eastern	591	2,646,143	2,068	2,701,851	155,071	2,546,780
North Western	1,385	5,505,784	1,322	5,508,294	286,329	5,221,965
South East Scotland	187	841,774	—	842,047	39,136	802,911
South West Scotland ...	698	2,191,618	359,874	2,551,492	110,224	2,441,268
TOTALS	11,567	45,658,038	483,549	46,242,837	2,661,019	43,581,818
Percentages of total generated		98·74	1·04	100·00	5·75	94·25

TABLE 4. EFFICIENCY OF STEAM STATIONS, 1948-9

Overall Average Thermal Efficiency for Year	Installed Capacity of Group of Stations	Output of Group of Stations	Average Period in Commission*	Average Period Plant Running*
%	% of total	% of total	Hours	Hours
26 and over	6·1	9·5	8,761	8,761
24 to 25·99	11·8	15·9	8,656	8,270
22 to 23·99	20·7	26·2	8,761	8,621
20 to 21·99	23·1	24·8	8,709	7,950
18 to 19·99	16·2	13·9	8,757	7,404
16 to 17·99	6·2	4·0	8,350	5,670
14 to 15·99	4·5	2·4	8,151	4,277
12 to 13·99	4·2	1·7	7,775	3,309
10 to 11·99	5·0	1·2	7,331	2,455
Under 10	2·2	·4	5,654	1,708
TOTALS	100·0	100·0	7,719 (average)	4,911 (average)

* *Owing to the introduction of summer time on March 14 in 1948, and on April 3 in 1949, the operational year had a total of 8,761 hours.*

busbar faults occurred in that period emphasising the need for quick acting discriminative protection at generating stations and at double busbar switching stations.

Operation

Load shedding with its attendant difficulties still caused considerable operational problems, and many risks which normally would not have been necessary had to be taken. This was particularly acute as far as line maintenance was concerned where a balance had to be struck between running with reduced transmission availability or risking transmission failure due to curtailed maintenance.

The estimated maximum potential demand during the year occurred on Friday, February 4 and amounted to 10,537 MW. The plant out of commission on that date was 11·8% and only 10,016 MW could be met.

Generation

The total amount of electricity generated in 1948 amounted to 46,043 million units, an

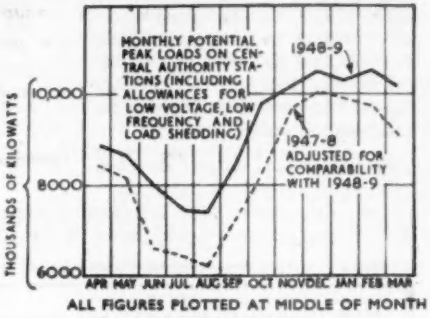
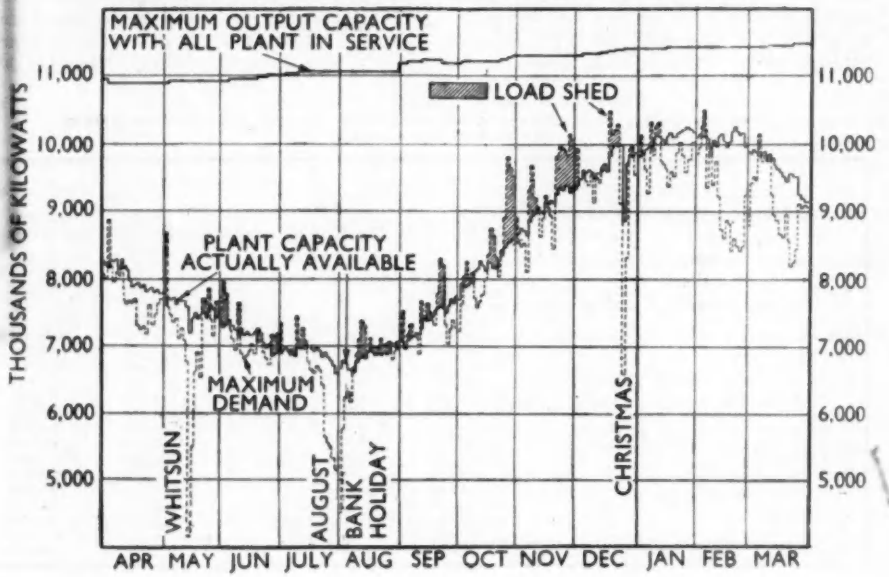

MONTHLY POTENTIAL PEAK LOADS ON CENTRAL AUTHORITY STATIONS (INCLUDING ALLOWANCES FOR LOW VOLTAGE, LOW FREQUENCY AND LOAD SHEDDING)
1948-9
1947-8 ADJUSTED FOR COMPARABILITY WITH 1948-9
THOUSANDS OF KILOWATTS
10,000
8000
6000
APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR
ALL FIGURES PLOTTED AT MIDDLE OF MONTH

Fig. 3.—Potential peak loads

increase of 9·3% on 1947. During the year ended March 31, 1949 the total quantity generated was 46,243 million units, an increase of 10·5%. Over the year, the all-over average thermal efficiency rose from 20·86% in March, 1948 to 21·15% in March, 1949, while fuel costs per unit sent out fell from 0·4297d. to 0·4098d. per unit.

Fig. 2.—Plant capacity and demand over the period April, 1948 to March 31, 1949



Commercial . . .

Commercial.—Revenues of Central Authority and the Area Boards exceeded by £4,391,684 the amount of their combined outgoings chargeable to revenue a/c. Total sales exceeded 39,000 million units—10% more than the 1947-48 figure. Average revenue received was 1·176d. p.u.—4% above the 1947-48 average. Consumers at March 31, 1949, amounted to 12,189,300. About 30% are on flat rates. A further 8,727 farms were connected during the year, bringing the total to 87,690.

The combined revenues of the Central Authority and the Area Boards taken together exceed by £4,391,684 the amount of their combined outgoings properly chargeable to revenue account. This surplus does not include any credit in the year's accounts for the proceeds of the Clow winter surcharge. Incidentally, the report makes it clear that the Central Authority and the Area Boards were most reluctant to implement the differential charge.

During the first year's operation of the B.E.A. and the 14 Area Boards over 46,000 million units were generated at stations owned or controlled by the Authority—10·5% more than the total for 1947-48. At March 31 last, there were nearly 12,200,000 consumers connected, or about 500,000 more than at vesting day, and over two millions more than were supplied by the former undertakings before the war.

Total sales to consumers exceeded 39,000 million units, again about 10% more than the 1947-48 figure.

Average revenue p.u. sold amounted to 1·176d.—4% above the corresponding average for 1947-48, and only 12·6% above the 1938-39 figure. For lighting, cooking and heating only, the average revenue was 1·445d. p.u., again 4% above the 1947-48 average, but 9% *below* the average for 1938-39.

A considerable portion of the commercial section of the report is devoted to tariffs, both bulk supply and domestic. A good step has already been made towards standardisation of the former. A further step is to be put into operation on April 1 next, when a uniform bulk supply tariff, subject to regional fuel cost adjustment, will apply to all the Area Boards.

In the domestic sphere the situation is more complex, although there is further evidence of the move toward standard tariffs. The B.E.A. inherited an immense variety of tariffs, and some aspects of the tariff structure taken over are indicated in an appendix to the report. This shows the number of consumers at vesting day supplied under the principal domestic tariffs. Out of the 10,495,649 consumers connected at April 1, 1948, a total of 3,109,963 were taking supplies through prepayment meters, while 7,385,686 were credit consumers. Surprisingly to some, perhaps, it is shown that no less than 17·5% of the total number of consumers were taking supplies only at lighting flat rates, while a further 12·9% were also supplied at such charges, in addition to supplies under cooking, heating, water heating or power flat rates. Thus, flat-rate methods of charge accounted for 30·4% of the total, and it is considered that this proportion would have been higher but for the fact that block-rate tariffs were extensively used in certain areas, obviating the need for alternative rates. Block-rate tariffs were used by another 11·4% of the consumers, with the variable block type accounting for 9·6%, and the fixed block type, not requiring assessment, 1·8% of the total.

Not unexpectedly, the two-part or all-in form of domestic tariff was utilised by 57·1% of the total number of consumers.

In an analysis of the various methods of assessment of premises for considering the variable-block and two-part tariffs together (which accounted for 66·7% of domestic consumers) some interesting figures are given. In the case of 29·1% in the group, assessments were based on rateable value; in 21% on some measurement of the dimensions of the rooms;

TABLE 5. SALES AND REVENUES BY USES

Revenue is in millions of pounds and energy in thousands of millions of units.

Year	Lighting, Heating and Cooking		Power		Public Lighting		Traction		Totals	
	Energy	Revenue	Energy	Revenue	Energy	Revenue	Energy	Revenue	Energy	Revenue
1946-47 ...	11·3	90·1	17·4	65·2	0·2	1·4	1·4	4·8	34·2	161·3
1947-48 ...	11·7	91·4	17·8	68·4	0·2	1·5	1·3	4·9	35·2	165·8
1948-49 ...	12·2	109·5	19·2	74·6	0·2	1·6	1·4	5·4	39·1	191·3

in 12·4% on the number of rooms, and in 4·2% on other bases.

The developments which took place on the commercial side of the industry from 1939 until vesting day are factually but briefly recorded, together with the steps taken to adjust certain tariffs in order to avoid serious loss, and the imposition, under instructions from the Minister of Fuel and Power, of the Clow surcharge.

Reference is made to the work being undertaken by the Retail Tariffs Committee set up by the Boards and the Central Authority. It is stressed that in planning the new tariff structure, a balance must be preserved between the possible advantages to the small consumers of the continuation of flat-rate methods of charge, and the need to ensure that the methods of charge are properly determined against costs. It is shown that both the two-part and the block-rate form of tariffs each have certain advantages over the other, and it is suggested that both methods may have to be retained in order to provide for the differing needs of consumers. But it would obviously be a move in the direction of added complexity rather than of simplification to introduce a further alternative tariff, it is noted.

The difficult problems surrounding farm tariffs are also dealt with at length, and here again some attempt is being made at standardisation. The aim is to devise a tariff system which will recognise the present predominance of household use, and at the same time encourage the much greater use of electricity in farm operations.

During the past few years there has been considerable rural electrification, and under the Act the Boards were specifically empowered to extend supplies to rural areas. It is gratifying, therefore, to record that during the B.E.A.'s first year of operation 8,727 farms were connected, making the total supplied at March 31 last 87,690.

Standardisation of Systems

Under the 1947 Act, the Boards are also required to promote the standardisation of systems of supply. The table prepared in 1945 by the Joint Committee of Electricity Supply Organisations is given in the Report. At that time, the cost of changing over equipment to a standard 240 V system was given as roughly £30 millions. It is obvious, however, that the cost of standardisation would now be substantially higher. In view of the shortages of labour and materials, and the urgency of other aspects of reorganisation, the Central Authority and the Area Boards considered it impracticable to undertake immediately the preparation of comprehensive schemes for a complete programme of standardisation, notwithstanding that the experience of the industry in the standardisation of a.c. frequency clearly showed that delay entails substantially increased capital costs. As opportunity presents itself, however, such limited schemes as are practicable are put in hand.

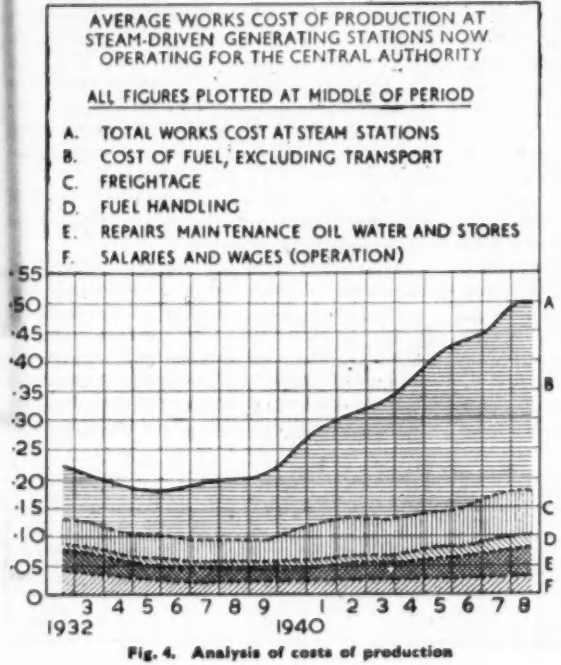


Fig. 4. Analysis of costs of production

At March 31, the number of consumers supplied on domestic power systems were:

Declared Voltage	D.C.	A.C.
250	27,302	489,442
240	208,797	2,335,466
230	239,699	5,982,632
220	160,463	301,991
210	24,542	362,784
205	8,075	148,180
200	81,445	1,235,607
100	672	8,697
	750,995	10,864,799

Load Growth

Several changes have occurred in the characteristics of the demand for electricity recently.

Before the war, the greatest demand occurred during the fortnight before Christmas, but with developments in the domestic, commercial and industrial uses of electricity, coupled with restrictions on display lighting, the load is now sustained at a high level from the latter half of November to at least the end of February, and cold weather now largely determines when, during this period, the highest demand of the year is reached.

It is emphasised that weather conditions throughout the peak load periods in both 1947-48 and 1948-49 were generally favourably. In particular, the coldest spell in the latter year coincided with the Christmas holidays. If it had occurred during a January mid-week, the peak load requirements would have been increased by some 500 MW.

In this commercial section, reference is made to the efforts to start a district heating scheme. The Authority gave close consideration to the Manchester Corporation's Wythenshawe project, and offered special terms for a limited period in order to foster the development of such a scheme and so obtain practical operating conditions with the dual-purpose class of generating plant. The Corporation, however, has not yet decided whether to proceed with the scheme. The Pimlico district heating scheme is well advanced, suitable plant being installed at Battersea power station. Negotiations concerning similar projects are also being conducted with the Swindon Corporation, and the Stevenage Development Corporation.

Financial.—The Central Authority made a loss of £607,149. The Eastern and South Western Boards also made a loss. Overall, however, the B.E.A. made a profit of £4,391,689. Profit on winter surcharge was £3.76 million which was placed to suspense account. Capital of B.E.A. increased over the year from £542 million to £662 million.

Financial...

The total capital obligations of the B.E.A. assumed on vesting day amounted to £542,059,226. The major part of this (£341,921,407) arises from compensation to companies by Guaranteed Stock. The local authority loans for which the B.E.A. became responsible were no more than £176,500,132. In the vesting of undertakings' assets the B.E.A. also acquired £42,595,280 of securities as well as £1,637,425 of tax reserve certificates which must be set off against the capital account. One other minor source of capital may be mentioned, the inheritance of £175,353 which stood to the credit of the Electricity Commission at their dissolution on August 1, 1948.

The complexity of liability for taxation in respect of the individual undertakings will be avoided in future years in view of the unification of accounts and similar simplification has been achieved in rating. The sum assessed for 1948-49 was £12,072,000. In subsequent years the amounts payable will be adjusted to reflect variations from the average rate in 1947,

TABLE 6. CONSOLIDATED & CENTRAL AUTHORITY ACCOUNTS

	B.E.A. and Area Boards Consolidated Accounts	Central Authority Accounts
	£	£
Sales of electricity ...	191,359,558	121,491,858
Sales of steam	340,566	340,566
Rentals on meters, etc....	3,851,090	—
Surplus contracting and sales of fittings ...	991,219	—
	196,542,433	**121,832,424**
Deduct:		
Generation: works costs	89,910,655	89,910,655
Purchase of electricity	1,406,674	1,083,270
Main transmission ...	1,112,107	1,112,107
Distribution	18,674,808	—
Rents, etc.	1,300,341	463,748
Rates	12,072,000	4,906,438
Administration and general expenses ...	20,811,184	3,395,481
Changes of systems (consumers' apparatus)	341,836	—
Depreciation of fixed assets	30,607,104	12,951,828
	176,236,709	113,823,527
Net revenue from trading	**20,305,724**	**8,008,897**
Add:		
From subsidiaries ...	43,046	43,046
Miscellaneous income	1,020,044	44,467
	1,063,090	**87,513**
	21,368,814	**8,096,410**
Deduct:		
Interest	15,852,510	7,792,468
Financing expenses ...	424,620	211,091
Amount written off in tangible assets ...	700,000	700,000
Tax	Nil	Nil
	16,977,130	**8,703,559**
Net revenue for the year	**4,391,684**	**—607,149**
Net transfer to central reserve	1,196,851	**—607,149**
Transfer to area reserves	2,150,000	—
	3,346,851	—
Balance carried forward	**1,044,833**	—

namely, 17s. 10d. in the pound (14s. 9d. for S.E. and S.W. Scotland). The sum will also be increased by one-fifth of the percentage by which the units sold rises above 1947 figures.

Diversity of practice also existed in respect of depreciation of assets. With regard to existing assets, depreciation will be largely a continuance of former practices based on the assets disclosed in balance sheets. For the future a decision has been reached to adopt the straight line method of depreciation and an enquiry has been set on foot to review the former Commissioners' table for the lives of plant. These points lend particular interest to the figure of £30 million for the cost of depreciation in the Consolidated Revenue Account.

The Year's Accounts

The accounts show that the Central Authority made a loss of £607,149 on the year, which is covered by a transfer from the Central Reserve Fund. Two area boards also made losses but when the profits of the other twelve boards are combined, an overall profit of £4,391,684 is shown for the B.E.A. as a whole or 0·8% on the total capital. It is stressed that this profit does not include the £3·76 million received from the winter surcharge, this being placed to a suspense account. Of the surplus obtained, £1·19 million is placed to the Central Reserve Fund, £2·15 million to Area Reserve Fund, and £1·04 million is carried forward.

Although strict comparison of the results with pre-vesting day accounts is not possible, it is shown that the average revenue per unit has risen from 1·123d. in 1947-48 to 1·176d. Working costs have likewise risen from 0·782d. to 0·857d., but interest on capital has fallen from 0·114 to 0·097d.

The full accounts are shown in table E both in respect of the Central Authority and for the B.E.A. as a whole including the area boards. The total capital liability at March 31, 1949, amounted to £622·5 million. Works cost of generation amounted to £89·9 million or 73·4% of the Authority's expenditure. Administration expenses totalled £3·4 million.

Labour Relations . . .

Comprehensive machinery has been set up for dealing with terms and conditions of employment, the reorganisation of the industry having produced many additional problems, and negotiation work has been heavy. At the end of the year this machinery comprised the National Joint Industrial Council for manual workers, the National Joint Board for engineering staff, the National Joint Council for administrative and clerical grades, and the National Joint (Building and Civil Engineering) Committee for building and civil engineering workers, while other negotiating machinery for managerial grades was under discussion.

The N.J.I.C. consists of representatives of the B.E.A. (including each Division), each Area Board, the North of Scotland Hydro-Electric Board, and representatives of the appropriate trade unions. There are also District Joint Industrial Councils for each Area Board, and

TABLE 7. FINANCIAL RESULTS OF EACH AREA BOARD

Area Board	Trading Revenue*	Net Revenue from Trading	Other Income	Interest and Financing Expenses, etc.	Net Revenue	Transfers to		Carried Forward
		Amount				Central Reserve Fund	Area Reserve Fund	
	£	£	£	£	£	£	£	£
London ...	28,421,253	1,780,152	413,486	1,048,914	1,144,724	291,000	400,000	453,724
South Eastern	12,956,826	692,338	64,471	585,057	171,752	138,000	—	33,752
Southern ...	14,732,745	1,023,038	39,798	680,455	382,381	161,000	100,000	121,381
S. Western	7,031,126	291,550	17,352	415,389	– 106,487	—	—	– 106,487
Eastern ...	18,630,573	466,203	99,787	921,239	– 355,249	—	—	– 355,249
E. Midlands	14,259,676	1,398,599	101,995	752,546	748,048	151,000	500,000	97,048
Midlands ...	18,472,428	1,300,713	93,752	766,224	628,241	195,000	250,000	183,241
South Wales	8,821,592	602,363	11,925	296,363	317,925	92,000	150,000	75,925
Merseyside...	11,448,726	508,146	38,551	406,011	140,686	120,000	—	20,686
Yorkshire ...	17,270,758	1,150,949	56,764	721,090	486,623	180,000	150,000	156,623
North Eastern	10,991,810	669,894	34,746	445,026	259,614	115,000	50,000	94,614
North Western	20,636,358	1,218,096	35,989	861,004	393,081	219,000	50,000	124,081
S.E. Scotland	4,103,063	553,268	13,008	157,388	408,888	43,000	300,000	65,888
S.W. Scotland	9,674,221	641,518	18,972	281,884	378,606	99,000	200,000	79,606
TOTALS ...	193,982,791*	12,296,827	1,040,596	8,338,590	4,998,833	1,804,000	2,150,000	1,044,833

* *This total excludes inter-Board bulk supplies,* £3,468,364.

TABLE 8. ANALYSIS OF UNITS SOLD UNDER VARIOUS TARIFFS BY THE BOARDS, ETC.

	Flat Rates		Two-part								
	Lighting	Heating Cooking Water Heating, & Small Power	Domestic	Commercial	Farming Tariffs	Large Power	Public Lighting	Traction	Total (Excluding Inter-Board Sales)	Sales to other Boards	Total Sales by Boards
Area Boards	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units
London	242,346	267,870	1,340,207	381,568	267	1,272,052	54,969	96,105	3,655,184	1,017,476	4,672,660
South Eastern ...	79,252	240,257	942,568	198,726	9,931	481,305	22,479	24,040	1,998,560	40,323	2,038,883
Southern... ...	83,546	234,827	883,209	239,141	8,828	799,004	16,400	18,657	2,283,012	55,012	2,338,024
South Western ...	53,281	152,696	536,173	78,411	11,304	330,189	8,820	170	1,173,044	184	1,173,228
Eastern	93,590	282,363	1,379,911	218,118	15,727	1,168,637	21 593	128,228	3,308,176	7,682	3,315,858
East Midlands ...	122,279	145,679	903,824	95,286	11,896	1,616,220	14,167	29,942	2,939,293	262	2,939,555
Midlands ...	169,138	351,846	1,012,406	83,319	9,770	2,359,976	16,358	55,891	4,058,704	16,909	4,075,613
South Wales ...	65,982	154,884	238,040	30,181	4,559	1,738,081	9,850	10,059	2,251,636	11,879	2,263,515
Merseyside & N.W.	107,670	149,654	605,473	109,615	30	1,394,968	13,479	103,843	2,484,732	—	2,484,732
Yorkshire ...	122,749	255,338	1,025,690	108,157	7,288	2,449,821	21,886	133,924	4,124,853	—	4,124,853
North Eastern ...	115,093	124,162	415,252	116,424	7,974	1,728,282	10,738	75,033	2,592,958	4,165	2,597,123
North Western ...	177,370	331,618	1,311,162	162,770	34,468	2,329,017	29,975	69,135	4,445,515	11,776	4,457,291
S.E. Scotland ...	31,853	69,704	261,639	58,997	8,210	349,047	9,140	35,904	824,495	—	824,495
S.W. Scotland ...	14,486	31,515	725,369	309,242	10,760	1,181,234	21,596	218	2,294,422	—	2,294,422
Total Area Bds.	1,478,647	2,792,213	11,582,923	2,189,957	141,012	19,197,833	271,450	781,149	38,435,184	1,165,668	39,600,852
British Elec. A. Sales to Railway Undertakers ...	—	—	—	—	—	—	—	622,798	622,798	—	—
TOTAL	1,478,647	2,792,213	11,582,923	2,189,957	141,012	19,197,833	271,450	1,403,947	39,057,982	1,165,668	39,600,852

Works Committees. The National Joint Boards and National Joint Councils follow similar patterns.

To promote increased efficiency, and improve the provisions for safety and welfare, a National Joint Advisory Council (on which sit eight members of the B.E.A.), District Joint Advisory Councils and Local Advisory Committees have been set up.

Safety and Welfare

Special consideration has been given to industrial safety and health, and an organisation with national and regional safety officers has been set up to promote safety measures. A new code of rules for maintenance of equipment is well under way.

Work is proceeding on the raising of the general standards of amenities, both industrial and recreational, and the number of canteens has been increased, and an extension of sports club facilities has been encouraged.

Education and Training

It is estimated that an annual recruitment of 500 technical and 5,000 manual workers will be required up to 1952.

Since the technical staff was the most pressing need a graduate training scheme has been prepared, and by the end of March last, nearly 300 trainees had been accepted.

Other recruitment schemes, including craft apprenticeships and student apprenticeships, have been put into operation.

A scheme of advanced training is under consideration by which the temporary exchange of staff takes place with overseas undertakings.

THE MINISTER'S REPORT

The Parliamentary report of the Minister of Fuel and Power covers the period from April 1, 1947 to March 31, 1949. It reveals that during the period ended March 31, 1948, 21 compulsory purchase orders made by the former Electricity Undertakers were confirmed, compared with five made by Electricity Boards in the following year; 4,844 consents to the placing of overhead lines were given in the first year, compared with 5,502 in the second year. In four cases the local authority was afforded a hearing before a consent was issued.

Sixty applications for consent to run electric lines across private land were dealt with during the two years, and there were nine outstanding from the previous year. After inquiries had been held, 50 consents were given, objectors signed voluntary agreements in 13 cases, consent was refused in one case, and five cases were outstanding at March 31, 1949. Twenty consents were given during the two years for alterations in type and/or voltage of current. Of 17 applications for approval of meters, 12 were approved for periods up to three years and five cases related to modifications of previously approved meters.

From August 1,1948, to the end of period of report, accidents involving the death of 29 persons and injuries to 110 persons were reported.

OUR READERS' VIEWS

First 11 kV Generators?

In the description of North Tees Power Station in the ELECTRICAL TIMES dated January 5, 1950, a claim is made for priority in the use of a generator terminal pressure of 11·5 kV, and we are told that the highest terminal pressure prior to the commissioning of the 20 MW sets at North Tees in 1921 was of the order of 6 kV.

To my personal knowledge, generators were in use in 1905 at Thornhill generating station with terminal pressures of at least 11 kV, and I think similar machines were installed at Radcliffe about the same time.

Probably there were others, but was not the first use of machines at this pressure by Ferranti at Deptford in 1891? Incidentally the capacity of the larger machines built for Deptford was about the same as those installed at North Tees 30 years later.

The views of others would be of interest, and I hope you agree that we should try to keep the records straight.

G. B. Melton

Generation Engineer (Construction),
Yorkshire Division, B.E.A.

The Wholesaler's Place

I note under the sub-heading "Unnecessary Competition" Megohm contends that the Electrical Industry is divided into three major sections: Generating and distribution; manufacture and design; contracting and retailing.

May I suggest that he has forgotten a very important section, namely Wholesale Distribution, a province of the Manufacturer and the Electrical Wholesaler.

A. B. Wildsmith

Director and Secretary,
Electrical Wholesalers' Federation.

B.E.A. AND FREIGHT CHARGES

FURTHER evidence in the B.E.A.'s case against the British Transport Commission's proposal to raise freight rail charges by 16⅔%, was given at the meeting of the Transport Tribunal last Friday.

Mr. A. Haywood, revenue purchasing officer, presented a table of the consumption and relative importance of the different methods of transport used to convey coal and coke to the B.E.A.'s generating stations. In this it was shown that whereas in 1939 only 58·6% of the total consumption of coal and coke by the stations went by rail, that figure had risen to 60·8% in 1948, and it was estimated that it would increase to 61·2% in 1949 and 61·9% in 1950-51.

He pointed out that the rail traffic to the generating stations showed several favourable operating characteristics, such as constant volume throughout the year, concentration of traffic and economic use of wagons and a good railway load factor. Before 1939, it was not difficult to secure exceptional rates for the carriage of coal by rail to power stations. Since that time, however, it had not been possible to obtain such rates for new stations unless negotiations were in progress before the war. He referred to Earley and Llynfi stations, to which the standard rates applied.

Reference was also made to correspondence between the B.E.A. and the B.T.C., in which the Authority, in investigating the merit of bulk transmission of power from the Midlands, asked for details of the cost of moving coal various distances. It was shown that such costs for the 42-mile transit from Denby Hall washery to Hams Hall power station was 9s. 1d. per ton, and for the 120 miles haul from Clifton to Brimsdown, 19s. 8d. per ton.

Later, Mr. Hayward said the total additional cost of the proposed increases for the year 1950-51 on all B.E.A. traffic was £1,700,000, or 13·2d. per ton.

In his evidence, Mr. W. B. Noddings, deputy commercial manager, B.E.A., declared that the increased cost from raising of transport charges would be passed on to the consumer. The incidence of the increase would vary according to the distance from the coalfields and the nature of the consumer's supply. Coal transport costs were at present 15% of the total works costs of generating stations, and this burden was aggravated by the comparatively low calorific value of low-grade coal now utilised. The high transport costs, in terms of heat units delivered, had led to consideration of the siting of power stations at coalfields and the bulk transmission of electricity to load centres. There was thus, in the long run, a danger of permanent loss to the railway of substantial coal traffic.

The Gas Turbo-Alternator

A new 750 kW unit made by Ruston & Hornsby Ltd.

IT is only natural to expect that a firm famed for oil engine production for many years should be interested in the development of the gas turbine for industrial use, and we were therefore pleased to be invited to see the 750 kW unit built by Ruston and Hornsby at their Lincoln works.

This particular set is a permanent installation in the power house of the works, and whilst not complex in principle is capable of giving thermal efficiencies of the order of 25%, a meritorious performance considering the size of the machine and the cycle adopted.

Preliminary work started in 1945 and designs were drawn up the following year. Testing was begun in June, 1949, and the machine, complete with alternator and exciters, installed later in the year.

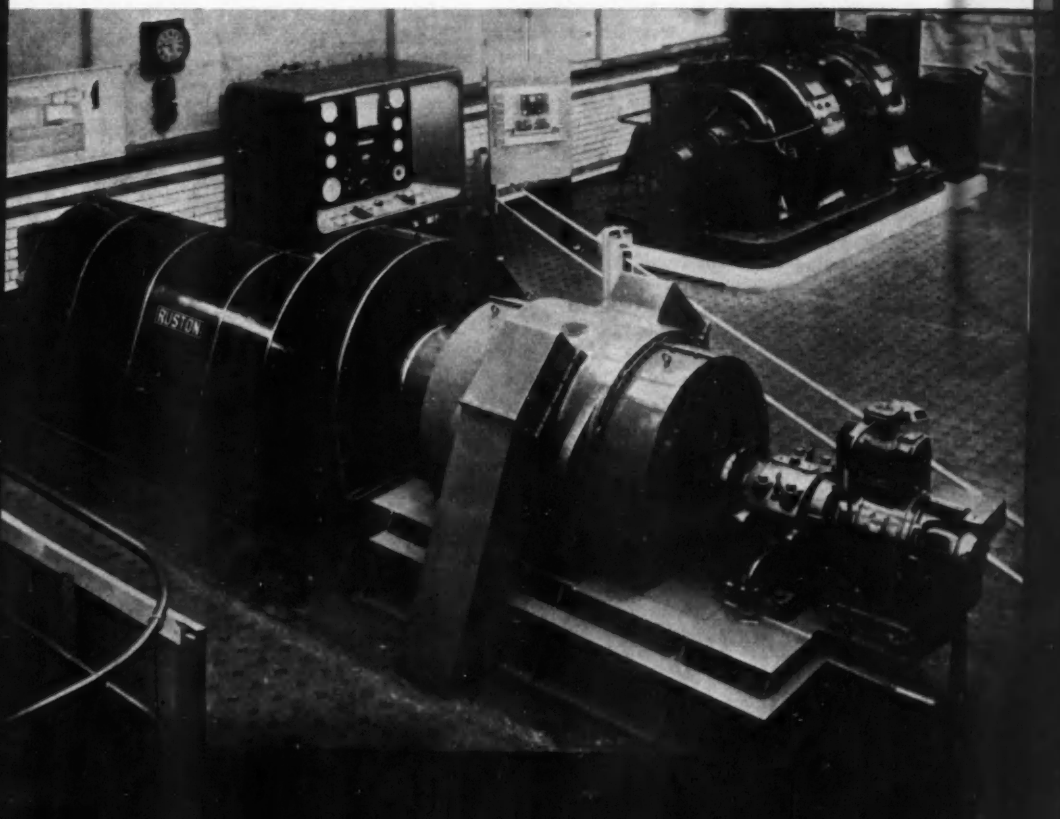
Machine Arrangement

A recuperative cycle embodying a large heat exchanger was adopted, the exchanger being mounted in the basement with the compressor, compressor-turbine and power-turbine mounted above. These units are axially in line, and the arrangement is such that inspection of each can be easily and readily carried out without dismantling any other part of the plant. The design is also sufficiently flexible to allow the machine to run as a non-recuperative gas-turbine, this arrangement being particularly applicable to stand-by sets and portable power plants where light weight and small size are of primary importance and some increase in fuel consumption can be accepted.

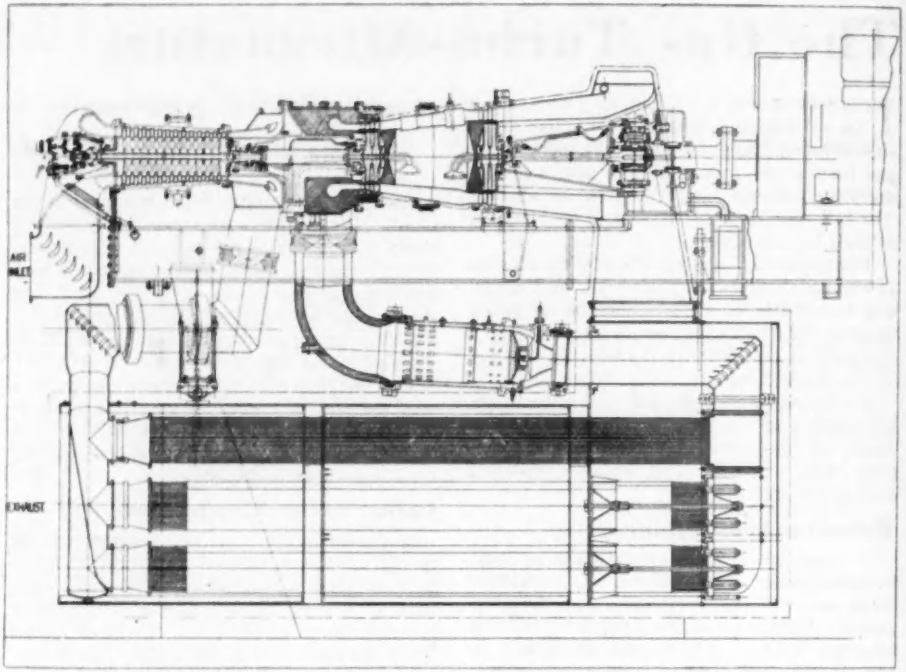
The fact that the compressor is driven by a separate turbine makes for easy and straightforward starting, the procedure being to run up the compressor unit by a starting motor and then to ignite the burners.

Compressor Equipment

A thirteen-stage axial compressor running in plain bearings is used, the rotor being of built-up disc construction with the discs secured by a central through-bolt. The casing is of standard construction, the fixed blades being dovetailed into the metal. A spring-loaded overspeed bolt is incorporated in the compressor rotor which releases the servo-oil pressure, and thus shuts down the machine at



The 750 kW set at Lincoln works



Longitudinal section of gas-turbine

a predetermined speed. At the front end of the rotor a light drive is taken off for operating the electric tachometer generator, and dogs are also provided for the engagement of the starter motor. This latter is a 15 h.p. 24 volt unit, although an air motor of equivalent power can be used.

The compressor is directly coupled to the compressor-turbine which is a two-stage machine again using a built-up rotor. Such construction has the advantage of facilitating the machining of the serrated root fixings for the moving blades, and also simplifies the problem of cooling. The fixed blades are again supported by dovetailed roots in the turbine cylinder, which is of segmental construction to allow for rapid heating without distortion.

Relatively thin section material has been used for the inlet ducting to allow the metal temperature to adjust itself rapidly to the prevailing gas temperature without the occurrence of large thermal stresses. Lagging inserted between this ducting and the outer casing which supports the turbine cylinder prevents large temperature changes being rapidly transferred between them and thus enables accurate control of the relative positions of the fixed and moving blades.

Power Turbine

A similar form of construction has been used for the power turbine which is connected to the alternator via an epicyclic gear-box. Care has been taken to make the critical speed of the discs (which are of necessity overhung) substantially above the running range of speed. The bearings for this turbine are an integral part of the reduction gear casing, an arrangement which simplifies the construction and also maintains perfect alignment.

Shafts and Bearings

The compressor rotor is a rigid assembly having a critical speed well above its running range, and is supported in two bearings. Similarly to the power turbine, the compressor driving turbine is overhung beyond its bearing and is mounted on a tubular shaft which drives the compressor through an involute tooth type coupling. This allows for a limited degree of flexibility but also transmits the axial thrust of the turbine which is balanced to a large extent by the thrust on the compressor rotor. Any out-of-balance is taken by a thrust collar and Michell bearing on the compressor rotor shaft.

Two bearings support the power turbine and the alternator shafts. A further steady bearing is provided in the gear-box to supplement the

location of the low speed shaft, provided by the main bearing. This bearing has been included in the design to meet those applications in which the output shaft is not located by the driven plant.

Cooling

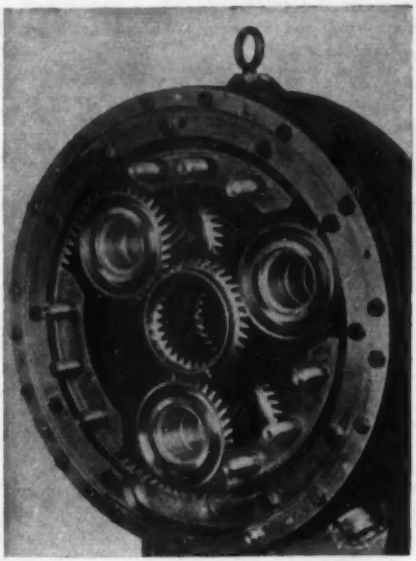
For cooling purposes, air is bled from the ninth stage of the compressor, and used for cooling the low pressure face of the compressor-turbine and also for the power turbine. A feed is also provided down the hollow shaft for cooling between the discs of the compressor-turbine. The high-pressure face of this turbine is cooled by air taken from the compressor discharge via a small external cooler which uses lubricating oil as the cooling medium. This system has shown itself most satisfactory in service.

Gears and Governor

A double helical epicyclic reduction gear is included between the power turbine shaft and the output shaft, to give a speed reduction of 4:1. The turbine drive enters the sun-wheel and output is taken from the three planet wheels, the annulus being maintained static. The reason for adopting this type of gearing is mainly due to the small size inherent in the design.

Apart from the gearing, the gear-box also contains the governor, the overspeed trip mechanism, and the tachometer drive. These components are contained in the rear cover of the gear-box and on assembly may be built up and tested separately prior to mounting.

The governor itself uses the usual turbo-type servo system for actuating the fuel controls, but is so designed as to cover a wide range of governor characteristics.



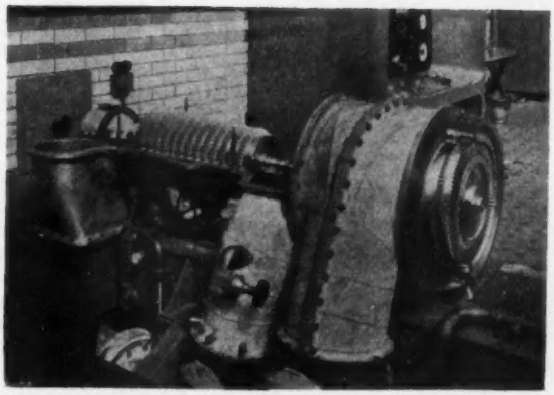
Epicyclic gear train with planet carrier removed

Combustion

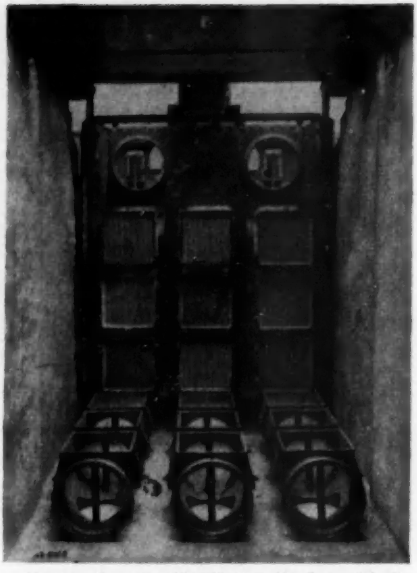
The two combustion chambers are mounted below the turbine, one being on each side. They are of the double walled type admitting cooling or secondary air to the main combustion chamber through holes in the inner wall. The whole arrangement allows for free thermal expansion on heating or cooling and also keeps the size small of the components which require a heat-resisting material. The two chambers are fitted with heat-resisting windows for visual inspection of the flame.

Initial ignition is performed by means of a high-energy spark across an ignition plug in the wall of the burner. The positioning of this plug is such that it may be left in place while the burner is operating and will yet provide reliable starting on subsequent occasions. Up to the present the fuel used has been gas oil, but the development of combustion chambers suitable for heavier grades of fuel is being actively followed up, and tests under service conditions are to be undertaken in the near future. This will of course involve the redesign of the combustion chambers.

The largest single item in the



View of gas turbine with casings removed to show compressor and compressor turbine. The power turbine section is not included



Heat exchanger with tube bundles in position]

installation is the heat exchanger, which is located beneath the machine. This houses nine identical tube bundles which operate in parallel. These tube bundles are arranged in three rows, each containing three bundles, the spacing between bundles being such as to provide passages round their ends for the admission of the exhaust gas, which passes outside the tubes. The high pressure air inside the tubes is collected in a header at each end of the tube bundles, each of which is provided with a piston ring expansion joint at the cold end. The pressure load resulting from this expansion joint places the tubes under a small axial compressive stress, and tension rods are provided at the high temperature end to carry the resulting load on the header assemblies.

Plant Arrangement

The arrangement of the plant is naturally dependent on site conditions. In the particular installation examined, however, certain points are of interest. The main frame is of box section and is also used as the oil reservoir for the plant. This considerably simplifies the oil pipe arrangements as the bearing drain pipes are led straight into the frame.

Whilst the turbine is supported by this special "backbone" structure, the alternator is carried on a conventional bedplate grouted into concrete foundations. The backbone frame, however, is supported at its front end by a cross-beam running on rollers to allow for any differential expansion of the frame.

The gas turbine is connected to the frame by a foot midway between the turbine and compressor, and by a swinging link at the front end of the compressor. This accommodates any differential expansion between the machine and frame without the imposition of stresses on either part. Flexible bellows have been provided in the ducting between the compressor and heat exchanger, and between the heat exchanger, combustion chamber and compressor turbine. These three bellows, in conjunction with a special type of pivot joint, enable freedom of relative movement to be obtained.

A further bellows joint is provided in the ducting between the compressor and the power turbines and this takes up the considerable axial expansion in this ducting, while a pair of longitudinal external tension bolts carry the pressure load and ensure that the power turbine stator is in correct alignment with the rotor.

Flexible joints are provided at the gas inlet to the heat exchanger and in the exhaust, while the heat exchanger casing is free to expand axially on its supporting springs.

Data

The following data may be of some interest. Fuel consumption varies between 0·59 lb/b.h.p.-hr at full load to 0·77 lb/b.h.p.-hr at half load. Shaft speeds at full load are: compressor —11,400 r.p.m., power turbine 6,000 r.p.m., output shaft 1,500 r.p.m.

As can be seen from the sectional drawing, the gas flow is as follows: compressor—heat exchanger — burner — compressor turbine — power turbine—heat exchanger—exhaust. The corresponding temperatures in the cycle, assuming atmospheric at 15° C are: entry to compressor, 15° C; exit from compressor, 195° C; entry to heat exchanger, 192° C; exit from heat exchanger, 420° C; entry to burner, 420° C; exit from burner, 730° C; entry to compressor turbine, 730° C; exit from power turbine, 480° C; entry to heat exchanger, 480° C; exit from heat exchanger, 275° C.

With a maximum gas temperature of 730° C, a compression ratio of 4:1 and a heat exchanger of 75% effectiveness; the full load plant thermal efficiency at the output shaft is 24%, and at 40% load the efficiency is 18½%. If the plant were run without a heat exchanger the efficiency at full load would be 17½%, falling to 11% at 40% full load. With the heat exchanger the maximum rated output is 1,070 h.p. and without the heat exchanger the maximum rated output is increased to 1,250 h.p. at the gearbox output shaft.

RUSTON HORNSBY–B.T.H. DIESEL-ELECTRIC LOCO

Whilst we were at the works, the opportunity was taken of examining a new diesel-electric locomotive built by Ruston and Hornsby in conjunction with B.T.H. This is primarily designed to fulfil the requirement for a medium size shunting locomotive, and can be manufactured to work on any gauge from and including metre, up to and including 5 ft 6 in. In working order it weighs 28 tons and has a wheel arrangement of 0-4-0 or 0-6-0 except in the case of metre and 3 ft 6 in. where the 0-6-0 arrangement is standard. Maximum tractive effort at starting is 18,000 lb and the top rail-speed 17½ m.p.h.

The engine is a Ruston 6 VPHL, six-cylinder vertical unit, having a constant rating of 155 b.h.p. at a speed of 1,250 r.p.m. This is directly coupled to a B.T.H. d.c. self-excited generator type RTB 6034; which has an inherent characteristic whereby the engine can in no circumstances be overloaded. Current from the generator is fed to a B.T.H. reversible series wound motor type K.E. 10 B.W., spring nose-suspended at one end from a cross-member of the locomotive frame and spigoted at the other to a double-reduction oil-lubricated gear-box carried by the road axle in plain bronze bearings, the final gear wheel being pressed on to a seat on the axle. The motor is thus at right angles to the axle.

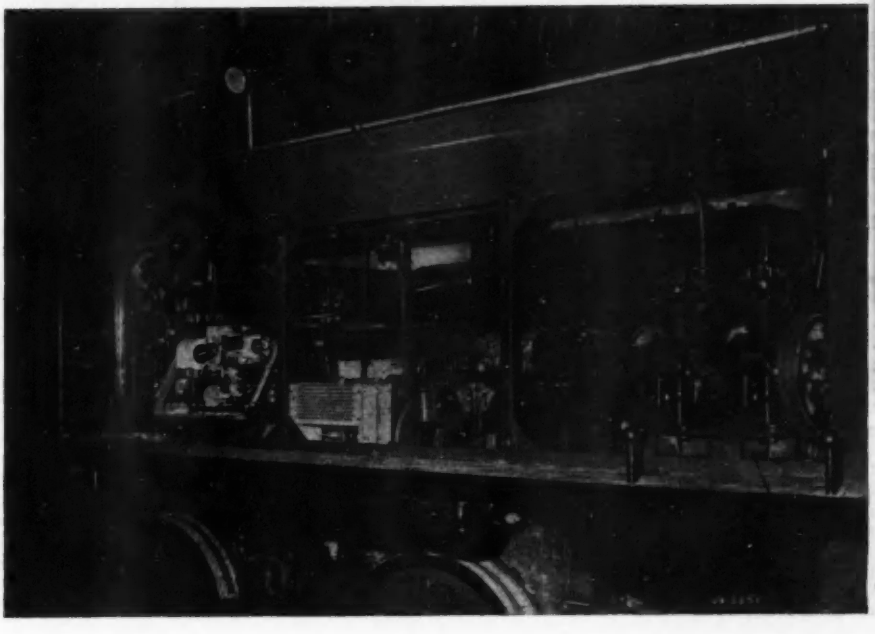
A 24-volt battery-charging generator is driven from the main engine and provides current for the relays, contactors, headlamps, rear lamps, cab light and cab heater.

With this form of transmission the control of the locomotive is greatly simplified. A single lever, working across a quadrant, is connected to the speeder gear and also to a switch which closes the main contactor and energises the electrical equipment as soon as the lever is moved from the "idle" position. A further lever changes the traction motor field connections for reverse working. Mechanical interlocking ensures that power is "off" when the reversing operation takes place.

Other safety precautions include a connection between air brake and power circuit so that an emergency brake application automatically cuts off power but a normal application will not do so.

Production Flow Foundry

The final item seen at the works was the new Beevor Iron Foundry in which "production flow" methods have been extensively adopted. This is a good example of a foundry in which



Ruston-B.T.H. diesel electric locomotive

the dust and dirt, usually regarded as unavoidable in this type of work, is virtually eliminated. Mechanised handling and mould-making is widely used, and a system evolved whereby a large variety of articles—up to a limiting size—can be handled without any change in production methods.

There are four green sand units capable of handling moulds from 16 in. x 14 in. to 48 in. x 30 in., and one dry sand unit in which moulding box sizes from 24 in. x 24 in. up to 54 in. x 40 in. can be accommodated.

When completed the foundry will be able to handle 250 tons of castings per week, but sufficient space is available for extensions as and when required. In fact, it is possible to accommodate the whole of the company's foundry work in this one building.

Particular attention has been paid to the welfare of the employees and a large Amenities Building provides ablution facilities, canteens, rest rooms, and locker rooms.

NEW LITERATURE

The Practical Electrician's Pocket Book, 1950

edited by R. C. Norris

IN its fifty-second year of publication this well-known pocket-book continues to increase its usefulness. This year's additions include new sections on battery electric vehicles, soldering and electronics in industry, while extensions have been made to the description of electricity in agriculture and ventilation. The useful notes on rewinding small motors have been completely rewritten, and a new mains-voltage table has been compiled. Published by Electrical and Radio Trading, 6 Catherine Street, Strand, W.C.2, 518 pages, 5¼ × 3¾ in. Price 5s.

Mechanical World Electrical Year Book, 1950

THE combination of reference tables and informative articles which characterise this annual publication are once more to be found. Outstanding amongst the additional matter is a long article on electric welding, written from the utilisation angle. Revision has also been made of the pages covering measuring instruments and electrical measurements. Published by Emmett and Co., Ltd., 31 King Street West, Manchester, 3. 357 pages, 6 in. x 4 in. Price 3s.

Incentives and Management in British Industry

by R. P. Lynton

THE problem of management-labour relationships in industry is one which requires as speedy a solution as possible if production is to be increased, and if full advantage is to be taken of technological progress. Mr. Lynton, in this excellent book, gives a wide survey of the situation today, traces its development from the trade guilds of the Middle Ages and discusses the possibilities in the future. The essence of his remedy is that a much better psychological relationship is necessary between workers and management. Although joint consultation is being widely adopted, it is not in itself a solution unless correctly and intelligently applied. The use of incentives also does not provide a complete solution, and where incentives are used they need to be carefully considered.

The argument is well presented and sustained, and the facts are heavily buttressed with an extensive bibliography. As, however, is inevitable with any book dealing with relationships between two groups or classes of people, a bias must exist, and, in this case, the author emphasises the workers' viewpoint in preference to that of the management. Nevertheless, there is comparatively little prejudice shown, and all who are interested in management or administration would do well to read this book carefully; there is much to be learnt from it. Published by Routledge and Kegan Paul, Ltd., 68-74 Carter Lane, E.C.4. 212 pages. 5½ in. by 8½ in. Price 15s.

M.M. Year Book

ALTHOUGH only a youngster among trade year books, this volume is fast gaining an increasing number of adherents. Although not a directory in the accepted sense of the term, it is a volume for machinery users containing information not readily available elsewhere. There is the usual diary, buyers' guide, list of machinery merchants and associations, in addition to several new sections. These include a review of industrial transport services and a section on fire prevention. Strongly bound, the volume should again prove extremely useful. Published by Machinery Market Ltd. 592 pages, 9½ in. by 5½ in. Price 15s.

Radio Frequency Heating Equipment

by L. L. Langton

DESIGN problems of r.f. heating equipment are the concern of this volume, and the underlying principles are set out in a straightforward manner. Dielectrics are considered first, then after a short chapter on eddy current heating come sections on thermionic generators, dielectric-heating work circuits, eddy current heating work circuits and thermionic valves. Power supplies are dealt with later, and the book concludes with two chapters on applications.

The work should prove most useful to those who come in contact with r.f. heating applications and who by consideration of the design of suitable thermionic generators wish to extend their knowledge of the operating conditions of the equipment doing the job. Published by Sir Isaac Pitman and Sons, 196 pages, 8½ in. × 5½ in. Price 17s. 6d.

OVERSEAS NEWS

Plans for Korea

Three power generation projects for Korea, to relieve the present electricity shortage there, have been approved by the Economic Co-operation Administration. They have an aggregate plant capacity of 59,400 KW, and involve the construction of two new steam stations and the completion of the Sumjin Gang hydro-electric scheme. The latter development, near Chouja, was started in 1942 by the Japanese, who completed about 40% of the work by the end of the war. Since then further work has been undertaken by the Koreans. The two steam stations are planned for the Seoul area (a 30,000 kW plant), and for near the main Samchok coal mine (15,000 kW station).

Australian Television

The new Postmaster-General of Australia has stated that he will adopt "a wait and see" attitude with regard to television. Because of the great improvements made in Britain, particularly in the colour field, he said, a halt had been called to Australian plans for local installations. He added that he had instructed that none of the tenders submitted last year for the erection of television transmitting stations be accepted. It is proposed to invite fresh tenders after the Broadcasting Control Board have made a new examination of the latest developments.

Extensions at Yallourn

Plans for extensions to Yallourn power station were announced recently by Mr. R. A. Hunt, chairman of the State Electricity Commission of Victoria. It is proposed to build as extensions two complete stations each of 100 MW capacity, at an estimated cost of £10 millions each. Work has already started on construction of the first extension, which should be in operation in 1953 and completed in 1954. The second extension should be completed in 1956. Later a third 100 MW extension may be added. Each of these extensions will house two 50 MW turbo-generators and six boilers, the latter being designed to burn raw brown coal. The generators will be installed in extensions to both ends of the existing turbine house. New transmission 220 kV lines will be erected parallel to the present lines. These major additions to generating plant will require a corresponding expansion of coal winning at the open cuts, and the annual output is to be increased from 6,000,000 tons to 10,000,000. By 1956, Yallourn will have an installed capacity of 381 MW, making it the largest power station in Australia, it is claimed.

Saskatchewan's Rural Policy

This year, the Saskatchewan Power Corporation is to embark on the first phase of a major farm electrification scheme. Aim of the Corporation is to connect 2,400 farms in 1950. Last year about 1,200 farms were given a supply, testing the rural electrification legislation passed at the last session of the legislature. The Corporation is still studying results of this work, although it is generally considered by officials as satisfactory. The complete rural electrification scheme may take more than 15 years to complete, it is believed, but meanwhile, to provide adequate power, generating plant is being added to and new transmission lines constructed. Three major steam plants are to be expanded in 1950, the equipment for which is now on order. These plants are at Estevan, Saskatoon and Prince Albert. There will also be changes in approximately 12 diesel generating plants. First section of a high voltage transmission system which ultimately will cover much of the province is almost completed. The line is between Estevan and Yorkton and is to transmit power from the Estevan plant where it is generated by the use of low cost fuel mined in nearby lignite coal fields. Other major transmission lines are planned for erection this year.

The Seattle Contract

Although Ferranti, Ltd., and the English Electric Co. offered transformers, switchgear and rectifiers to the Seattle City Light concern at prices considerably below their American competitors, their tenders have been rejected because they were said to fail to conform to specifications, it is reported. The city's buying agent added, "that the tenders were impracticable because of the difficulty in returning defective or damaged transformers."

Abitibi's New Plant

The first two generating units of a 14-unit hydro-electric station at the Iroquois Falls, Ontario, mill of the Abitibi Power and Paper Co. Ltd., have been put into operation, the company announces. Three more units similar to the two just started will be brought into commission shortly.

Vancouver's Suggestion

The Mayor of the Vancouver City Council has announced that the Council is to investigate the possibility of acquiring ownership of the undertaking of the British Columbia Electric Railway Co. within the city. Under the terms of its agreement with the company, the city has the right to make an offer of purchase of the undertaking every five years.

Out in the Yukon

It is anticipated that the Federal Government will shortly reach its decision regarding the possibility of erecting hydro-electric plant for the Yukon Territory to serve the Mayo area. The surveys of possible dam sites, authorised by the Yukon Government, were completed last summer. Under consideration at that time were two locations on the Mayo River and at the outlet of Mayo Lake.

Canadian H.E. Progress

In his review of progress made in 1949 in hydro-electric construction and distribution in Canada, the Minister of Mines and Resources reports that nearly 480,000 h.p. was added to the country's generating capacity during the year, bringing the total to more than 11,600,000 h.p. The review this year includes the generating capacity of the new province of Newfoundland. There were no large plants put into operation during the year, the increased total capacity being comprised chiefly of additions to new plants which were partly completed in the previous year. Definite commitments for future development amount to over 2,000,000 h.p., and a large amount is subject to surveys, investigations and long-range planning. The report shows that primary power consumption increased in nearly all sections of the country, the demand being 3% above the 1948 figure. In particular, rural electrification has been very active in the provinces of Quebec, Ontario and Manitoba.

Appliance Market in Switzerland

Swiss electrical household machinery manufacturers are complaining that increasing imports of machinery mainly from the U.S. are swamping the local market at a time when high tariffs make it practically impossible to export similar machinery to the U.S. This refers mainly to equipment such as refrigerators, vacuum cleaners, washing machines, electric irons, and cookers, it is stated. There is less enquiry for British and German equipment, the first is said to be more expensive than similar U.S. makes, while the latter industry's designs are regarded as unsuitable for Swiss tastes.

Dutch Extensions

Orders have recently been placed with the Stork Engineering Works at Hengelo, Holland, for the construction of seven 192,000 lb/hr boilers and three 30,000 kW turbo-generators for installation in the municipal electricity works of the Hague and also for Leyden. Of the total, four boilers and two turbo-generators are for Leyden.

Italian Extensions

The project for the installation of new steam generating plant of a total capacity of 50 MW at the Porto Marghere power station, Venice, has been approved by the Economic Co-operation Administration. Much of the equipment will be purchased from the U.S.A.

Silicones in France

It is reported that the American concern, the Dow Corning Corporation, has arranged for the production in France of silicones for electrical insulation purposes. Production is expected to start this year, and output of between 3,000 and 6,000 lbs monthly is being planned.

Protecting India's Industries

The Government of India has accepted the Indian Tariff Board's recommendation that the existing protective duties on non-ferrous metals, which are due to expire on March 31 next, should remain in force for a further year. The Government has also accepted a recommendation by the Tariff Board that the local plastic industry be granted protection until March 31, 1953.

New Station Project

Work commenced last week on the construction of the new Vierfontein power station, near Klerksdorp, for the Electricity Supply Commission of South Africa. The station has been designed for an ultimate capacity of about 200 MW, and initially three 30 MW sets will be installed, the first to be on load in 1953. The boiler plant is being designed to burn the low grade coal from the local coalfield. The station is primarily intended to supply new goldfields in the Orange Free State.

No Water Power in S. A.

The water flow from the Vaal River basin could not be compared with that in the Tennessee Valley, Mr. W. H. Milton, chief commercial engineer of the Electricity Supply Commission of South Africa, stated at a conference recently. He agreed with Dr. D. F. Kokot that in general it would be cheaper to produce electricity by means of thermal stations than by developing the Union's principal rivers. Earlier, Dr. Kokot had estimated that the Vaal River could be utilised for the generation of about 70 million units annually by a station rated at 8,000 kW. This capacity was insignificant, for the peak load in the Vaal River basin would soon exceed 1,000,000 kW.

New Synthetic Mica

The successful production of a new synthetic mica, by scientists of the U.S.A. National Bureau of Standards, was claimed by Mr. C. Sawyer, Secretary of Commerce, last week. The synthetic has essentially the same properties as natural mica, but is claimed to be superior in its ability to withstand high temperatures, due to the use of a fluorosilicate compound as a crystallising agent, according to the report. Its other ingredients are quartz, magnesite and bauxite. The development is regarded of some importance in America, for the U.S.A. is a very large consumer of natural mica; in 1948 over 10,000 tons was imported.

PERSONALITIES

In the Industry

A signal honour has been conferred on a well-known and popular member of the electrical industry—**Mr. R. A. McMahon,** secretary of the Electrical Research Association. The President of the French Republic has conferred upon him the Order of *Chevalier de la Legion d' Honneur,* for services to Anglo-French relations of friendship over many years. This award has particular reference to his valuable liaison work in the electricity industry and for the C.I.G.R.E. over the past 21 years—a fine record of which he may well be proud. We can also now reveal that it is also in recognition of his liaison work between France and Gt. Britain during the last war.

Mr. R. A. McMahon

At the recent annual dinner and dance of the staff of the Worcester & District Sub-area of the Midlands Electricity Board, **Mr. R. Randall,** A.M.I.E.E., sub-area manager, was presented with a silver tea service on behalf of the staff of the Kidderminster district, where he was formerly manager.

Our photograph below was taken at a dinner given recently by the directors of T. M. C. Harwell-Sales, Ltd., to mark the retirement of their managing director, **Mr. H. M. Harris,** from active business. Mr. Harris, who is to become chairman of the company, has been in the industry for 55 years. He started an electrical wholesale business in South Africa in the 1890's, and returned to England in 1907. After serving in the 1914-18 war, he formed Harwell, Ltd., to distribute various electrical goods, and when that company's business was taken over by the Telephone Manufacturing Co., Ltd. in 1933 to distribute "Temco" electrical accessories and synchronous clocks, he became managing director. He was for many years chairman of the British Synchronous Clock Conference, and a member of the standing committee of the electric wiring accessories section of B.E.A.M.A.

Newly nominated assistant chief engineer of the motor department of the Metropolitan-Vickers Electrical Co., **Mr. A. Walsh** has been section leader in that department for the past twenty years. After serving his apprenticeship with the firm he joined the electrical engineering department, becoming a member of the design staff.

Mr. O. G. Cook, A.M.I.E.E., manager of the Keighley district of No. 1 Sub-area of the Yorkshire Electricity Board, has been elected president of the electricity branch of the Bradford N.A.L.G.O.

At the annual general meeting of the Electrical Trades' Commercial Travellers' Association **Mr. C. L. Elvy** was elected chairman, and **Mr. N. V. Everton,** as president, for the ensuing year. Mr. Elvy has been well known in the wire and cable industry for over 25 years; he represents several prominent manufacturers. Mr. Everton is, of course, sales manager of the Lamp and Lighting Fittings Department of the Metropolitan-Vickers Electrical Co., Ltd., and a director of subsidiary concerns.

Mr. C. L. Elvy

Recently assumed his new duties as deputy director of establishments to the B.E.A. at Headquarters, is **Mr. W. J. Rowland,** F.C.C.S., who was previously secretary of Nos. 4 and 5 Sub-areas of the Merseyside & North Wales Electricity Board. On his departure from Rhostyllen he was presented with a gold watch and a brief case as a token of the staff's esteem.

A group at the T.M.C. dinner: Mr. H. M. Harris is standing at the rear

The South Western Electricity Board has appointed **Mr. W. R. Rowe**, A.M.I.E.E., as sub-area commercial officer for the Cornwall Sub-area in succession to **Mr. H. W. Millatt**, who is now district manager at Weston-super-Mare. After technical training at Faraday House, Mr. Rowe became assistant engineer with the Cornwall Electric Power Co., and in 1938 secured an appointment as deputy engineer and manager of the Ilfracombe Electric Light and Power Co. He rejoined the Cornwall E.P. Co. in 1940 as assistant district manager at Penzance, subsequently becoming senior assistant commercial engineer, and later district manager there. Since October, 1948, he has been rural development officer in the Cornwall Sub-area.

Mr. W. R. Rowe

Mr. J. H. Angus, M.I.E.E., has been appointed special consultant on electric power developments for the United Nations programme of technical assistance for economic developments.

Until recently superintendent of the Erection Department of the Metropolitan-Vickers Electrical Co., Ltd., **Mr. A. W. Clarke** has now retired and has been succeeded by **Mr. H. C. Young**, M.I.Mech.E., M.I.E.E., M.Inst.F., who was previously deputy chief engineer of the General Engineering Department. Mr. Clarke joined the company in 1902, and after some years in charge of the erection of steam turbines, was appointed in 1920 to the position from which he has now retired. Mr. Young has for many years been associated with the erection and engineering departments, mainly in connection with steam turbine power stations and railway electrification work, and has travelled extensively.

Mr. A. W. Clarke

Mr. H. C. Young

Mr. R. G. Brandon, left, receives the glassware and silver tray

To commemorate his completion of 25 years' service with the Lamp and Lighting Sales Department of the British Thomson-Houston Co., Ltd., **Mr. R. G. Brandon** was presented with a set of glassware and a silver tray at a reception held recently in his honour. Our photograph above shows **Mr. V. C. H. Creer**, director, making the presentation on behalf of the staff of the department. Mr. Brandon has now taken up full-time duties with the Hotpoint Co., as we earlier recorded.

His many friends will be concerned at the news that **Mr. J. F. Shipley**, M.I.E.E., senior partner of Mackness & Shipley, consulting engineers, was wounded by bandits at Bangkok, Siam, last week, when he attempted to prevent a highway robbery. Our latest information is that two bullets have been removed, and he is now making steady recovery.

Mr. C. K. F. Hague has been appointed deputy chairman of Babcock and Wilcox, Ltd., in place of **Sir Archibald McKinstry**, who has resigned that position, but who has intimated his willingness to remain on the board. Mr. Hague retains his position as managing director in addition to becoming deputy chairman.

Westinghouse Brake and Signal Co., Ltd., announces that **Mr. J. Griffith Hall**, secretary, has been appointed director and secretary, and **Mr. Mervyn W. Shorter**, sales manager, has been appointed director and sales manager.

The Rank Organisation has announced that **Sir Robert Watson-Watt** has joined the board.

Mr. P. P. Wheelwright, well known as one of the pioneers of the electricity supply industry and electrical engineer of Blackburn for many years, has completed 50 years as a member of the Institution of Electrical Engineers and has been elected honorary life member. Mr. Wheelwright has many interests, both commercial and engineering, in the industry, and was one of the founders of Electrical Safeguards, Ltd.

Today, January 19, marks the retirement of **Mr. W. G. Turner,** M.INST.C.E., M.I.E.E., M.I.MECH.E., from the position of manager of No. 3 sub-area of the Southern Electricity Board. His successor is **Mr. E. A. Logan,** M.SC., M.INST.C.E., M.I.E.E., as we exclusively announced in our September 1 issue. Mr. Turner was normally due to retire a year ago but agreed to continue in office until the co-ordination and organisation of the districts in the sub-area was further advanced. Prior to vesting day, Mr. Turner was borough electrical engineer at Southampton—a position he had held since 1920. Before that he was chief assistant engineer to the Newcastle and District Electric Lighting Co. A Londoner, he served his apprenticeship with C. A. Parsons and Co. He is a past president of the University College of Southampton Engineering Society and a past chairman of the Hampshire sub-area of the I.E.E.

Mr. W. G. Turner

The list of chairmen of the Cable Makers' Association at Affiliated Associated Associations for the year 1950 are as follows:—

C.M.A.: **Mr. F. Anderson,** director of W. T. Henley's Telegraph Works Co., Ltd.

Mains Cable Manufacturers' Association: **Mr. R. A. Bebb,** Crompton Parkinson, Ltd.

Mains Cable Manufacturers' Association (Super Tension): **Mr. E. B. Hebditch,** Pirelli General Cable Works, Ltd.

Rubber and Thermoplastic Cable Manufacturers' Association: **Mr. C. H. Broughton Pipkin,** British Insulated Callender's Cables, Ltd. Overseas Rubber Cable Manufacturers' Association: **Mr. F. W. M. Lewis,** Siemens Brothers and Co., Ltd.

Mr. F. Anderson

We are very pleased to learn that **Mr. V. A. Pask,** M.I.E.E., M.I.MECH.E., chief engineer to the B.E.A., has recovered from his illness and has returned to work part-time. We trust he will soon be completely fit, and able to resume his full duties.

At present principal assistant to the C.M.E., Swindon, **Mr. K. J. Cook** has been promoted to mechanical and electrical engineer, West Region of British Railways.

OBITUARY

We regret to record the recent death of **Mr. H. Fitton,** North Midlands and North Eastern sales representative of Britmac Electrical Co., Ltd. He was also a member of the Leeds Electrical Club.

His friends in the Midlands and North of England will regret to hear of the death on January 8, of **Mr. J. A. Robertson,** technical and sales representative of the Glasgow office of Bastian and Allen, Ltd.

We regret that in our note last week of the death of **Mr. T. H. Varcoe,** manager of the Birmingham branch of Siemens Electric Lamps and Supplies, Ltd., his name was mis-spelt.

We note the recent death of **Mr. A. Bowes,** who served with the West Hartlepool Corporation Electricity Department for 44 years, retiring from the position of commercial assistant in October, 1942.

We regret to record the death on January 4 of **Mr. R. Stewart,** aged 55, construction engineer (transmission) of the South East Scotland Division of the B.E.A. After early experience in New Zealand, he returned to Scotland in 1929 as section engineer with the C.E.B., serving in that capacity at Galashiels, Portobello, Parkhead and Abernethy until vesting day.

Mr. E. B. Hebditch

Mr. R. A. Bebb

Mr. C. H. B. Pipkin

Mr. F. W. M. Lewis

Water Heating by Electricity

AN interesting paper dealing with domestic hot-water supplies was recently presented to the Institution of Heating and Ventilating Engineers by J. C. Weston. The field covered was comprehensive, embracing all types of heat source in general domestic use, including electricity, solid fuels and gas. It was shown that solid-fuel appliances were by far the most widely used, being installed either alone or together with gas or electrical appliances in 64% of households. Gas was used in 37% of households and electricity in 10%, but whereas gas was frequently used alone (17%) electricity was rarely (2%) the only source of hot-water.

The types of electrical equipment used were divided almost equally between wash boilers, immersion heaters and self-contained storage heaters. Measurements of hot-water consumption had been made on the eight houses at Bucknalls Close and twenty at Abbots Langley. It had been found that those houses which used electricity during the summer of 1949 the mean weekly consumption was 166 gallons, whereas in those using solid fuel the consumption was 223 gallons.

With thermostatically controlled immersion heaters, in lagged tanks it was noticed there was a remarkably high standby loss. This amounted to as much as 57 kW hr/week. Calculations for the actual insulated tanks showed that this should not be much more than 25 kW hr/week, plus about 10 kW hr/week for losses in pipes. It was noticed that opening the airing cupboard door increased the loss by 18 kW hr/week.

On costs, it was shown that with gas at 1s. a therm, electricity at ¾d. a unit and coke at 90s. a ton, the cost of providing 200 to 250 gallons of water/week during summer was about the same at 3s. to 4s. This did not take into account any capital charges. For consumption in excess of 250 galls/week during the summer, solid fuel was likely to be cheaper than gas, but for consumption below 200 galls/week electricity or gas was likely to be lower than solid fuel.

TWO I.E.E. HONOURS

THERE will, we feel sure, be general approval of last week's action of the council of the I.E.E., in electing **Prof. E. W. Marchant**, D.SC., M.I.E.E., F.C.G.I., to honorary membership of the Institution for his outstanding work in the advancement of electrical knowledge, and awarding the Faraday Medal to **Sir James Chadwick**, M.SC., PH.D., F.R.S., for his contributions to science, in particular to the field of nuclear physics.

Prof. Marchant has been in the teaching profession since 1900 when he was appointed senior lecturer under Silvanus P. Thompson at Finsbury Technical College. Earlier he had worked with the late Mr. W. Duddell on the development of the oscillograph, and as superintendent of Lord Blythswood's laboratory and workshop at Renfrew from 1897 to 1900. In 1901 he became lecturer in electronics at University College, Liverpool, and in 1903, when Mr. David Jardine gave £10,000 to the university to endow a chair of electrical engineering, he was appointed the first professor, a position he held till his retirement in 1941. He was responsible for the building and equipment of electrical engineering laboratories at the university costing about £25,000.

Prof. E. W. Marchant

The list of scientific papers due to Prof. Marchant is a formidable one, the subjects ranging from high-voltage power transmission, to haulage on canals, wireless telegraphy and galvanometers. They date from 1892 onwards. He was president of the I.E.E. in 1932, and first chairman in 1919 of the then Liverpool sub-centre which later became the Merseyside and N. Wales Centre, of which he was chairman in 1929. During the recent war he took part in important researches carried out for the Ministry of Supply.

Sir James Chadwick early collaborated with Lord Rutherford in research work at the Cavendish Laboratory; the fundamental researches they then conducted laid the foundations on which the structure of modern nuclear physics rests. He went to Liverpool University in 1938, as Lyon Jones Professor of Physics, remaining there till 1948. For his discovery of the neutron, which opened the way to the fission of the nucleus of the uranian atom, he was awarded the 1935 Nobel Prize for physics. His services during the late war in connection with the development in the use and control of nuclear-energy were recognised in America by the award of the U.S. Medal of Merit. He was knighted in 1945, and in the following year appointed scientific adviser to the United Kingdom on the United Nations Atomic Energy Commission. He returned to Cambridge in 1948 as master of Gonville and Caius College.

Sir James Chadwick

PROBLEMS and PRACTICE

In Engineering

Design for Rocker Switch

WORKING in a large store, I was given the job of lighting the stockrooms for shoes, etc. Being of modern design the stockrooms were built separate from the salons, and assistants entered by one door and went out by another, passing through 3 ft passages between roof high shelves. To effect economy in lighting, two lamps per passage with two-way switching was proposed, but ordinary switches, ceiling switches and various push types were found to be impractical for assistants burdened with goods, etc. I was then asked to devise a switch for the job and after some thought, designed the following arrangement. A box of the size given was made, with the top and bottom ends screwed on, so as to be detachable. A standard 5 amp 2-way switch, with metal dolly was fitted in the centre and immediately behind it, outside the box, a conduit box with holes suitably drilled and bushed was fitted.

A ¼ in. clearing hole was drilled in the top and bottom ends, in the same line as the switch dolly pivot. Brass bushes, bored to fit a ¼ in. shaft were inserted into these holes tightly.

A wooden rocker arm with a cutaway section was made, and corresponding holes as above, without bushing, were drilled in each arm. A hole to accommodate the dolly was drilled centrally and fitted with a brass bush. The vertical sides of the cutaway section were bevelled at 60° to the centre line to allow a swinging movement. Two ¼ in. cupheaded bolts were fitted and bolted leaving enough length to pass through the end bearings. The bearings were then greased, the rocker arm was put over the switch and the end plates screwed down. The arm was then moved and the limit of travel marked in each direction. A suitable skirting was fitted all round to act as a stopper, and the complete switch was bolted on to the end of the shelf upright at elbow height by means of three ¼ in. cuphead bolts and nuts. Oak was used for durability and wiring was brought in by conduit fitted to the ¼ in. end box.

Finding this arrangement satisfactory, units were then made for all departments and have functioned for some years now, without trouble.

Any readers faced with an awkward switching problem may be glad to use this arrangement which only requires a slight knock from the elbow to produce light.—*J. T. R.*

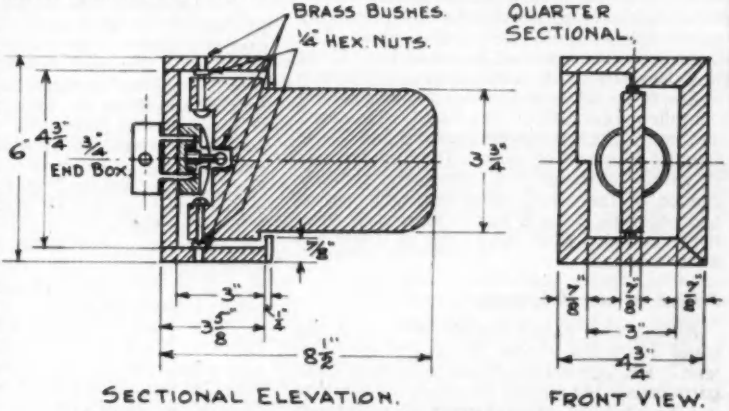
Fault on a Submersible Pump

ON a floatswitch controlled submersible pump it was found that the tank which the pump was feeding overflowed at irregular intervals. Inspection of the starter panel showed that every operation of the contactors was correct, and that insulation tests gave good readings.

The fault was found after a second overflowing of the main tank, when the control switch, which was mounted on the top of the panel, was switched from "floatswitch" to "off" position. The pump still remained pumping, but when the main supply switch fitted to the panel was put to the "off" position and then switched back in again, the pump remained at rest. Further inspection inside the panel failed to show any fault.

On dismantling the control switch it was found that a bridge had been formed due to the switch contact filings and dust. With damp conditions this held the circuit complete, keeping the time-lag coil contact in position, and therefore all working contactor coils energised. —*C. B. T.*

Contributions to this page, dealing with specific problems and items of interest to practical engineers are welcome, and will be paid for at our standard rates. Items should be brief, and preferably accompanied by diagrams or sketches, which will be redrawn for publication.



Details of elbow-operated rocker switch for use in storeroom passage.

SOME POSSIBLE IMPROVEMENTS

Troubles of the Practical Man

By W. H. ATKINSON

ANYONE who has spent a few years in the electrical industry will agree that there are many pieces of equipment and accessories which fall short of excellence through some minor point which has been overlooked by the designer. There are few of us who do not consider that we could improve almost anything. Frequently we can.

For example one manufacturer distributes fuse-bridges constructed as shown in Fig. 1, where A is one end of the porcelain bridge through which a screw is passed. A clearance hole in B permits the screw to reach the tapped hole in the brass piece C. It will be seen that the current passes from B to C and that contact between these parts depends entirely on the screw being tight.

On no less than six occasions in the past eighteen months I have observed overheating as a result of the screw slackening. Heat develops between the pieces and the spring contact loses its temper, resulting in a soft contact with the base and further heating which ruins the base contacts. If nothing worse results the entire base and bridge require renewal.

There is a limit to the extent to which the screw can be tightened on the porcelain and a spring washer is not a satisfactory solution. Would not a small rivet through B and C be a useful addition to this unit? And would it add so much to the cost?

Some years ago I noticed a peculiar fault with a bridge of this description. A new 3 ph. switch-fuse had been fitted to isolate the oil-switch starter of a three phase motor. On being started the motor obviously single-phased. The fuses were examined and found to be O.K. as was the starter. A voltmeter traced the fault to one fuse. When the bridge was dismantled the following condition was found. The screw had been tight but between parts B and C was found a fragment of paper. The hole through B being clearance the extremely unlikely chance of the screw being perfectly centred had occurred. Thus B and C were most effectively insulated from each other in a way not easily detected.

Fuse Wire Fixing

Again, who hasn't lost patience with the usual screw-and-washer fixing for the fuse-wire? The slightest roughness in either of these parts causes the washer to rotate. If the wire has been wound on clock-wise the wire binds and breaks. If the other "hand" the wire is wound off again. And it is not always the skilled man who rewires the fuse.

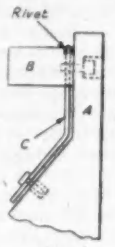


Fig. 1

Sketch 2 shows a simple and effective answer to this nuisance. E is a small strip looped at the top end and located through a hole in C in addition to the usual screw. The fuse-wire is passed through the loop, pulled down, and the screw tightened.

The following simple method of circuit identification fitted in a small work in a remote part might be of interest. At each point a letter of the alphabet can be seen on an inconspicuous metal tag. These are fixed between the ceiling rose and the ceiling with the screw passing through a hole in the tag. The sockets having a steel box casing, the electrician had impressed the letter on the case with the usual metal types. These types and a small piece of zinc were used for the tags.

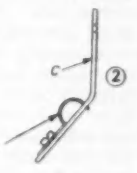


Fig. 2

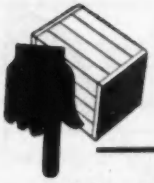
The fuses are taken to read from left to right, A, B, C, and so on. On going to a defective point the letter is noted and the fuses identified at once.

Geared Motor Units

The increasing use of geared motor units prompts one more suggestion. Let us take the case of a motor running at over one thousand r.p.m. with the final shaft rotating at a low speed. It takes a considerable effort to turn the unit by hand from the final shaft end, even if it is possible and advisable. If, now, this is coupled to a machine, how is the maintenance man to judge whether or not his machine is mechanically free and in a condition to be started after making an adjustment?

Must he dismantle the unit from the machine on each occasion? Is he to be denied the satisfaction of knowing that all is well by the time-honoured method of a few turns by hand before applying power?

There appears to be sound sense in the manufacturers of such units permitting access to the motor shaft, at the end remote from the gear, either by a squared end or, better still, a small hand-wheel behind a hinged cover.



THE BUYER'S COLUMN

Safety in Furnace Operation

FLAME failure in an oil- or gas-fired furnace may easily result in an explosive fuel/air mixture forming, unless the fuel supply is disconnected immediately the flame is extinguished. The required swift control is given by the "Furnace Safeguard" manufactured by Elcontrol Ltd., 28a Tilehouse Street, Hitchin, Herts, which relies for operating on the conductivity of flames.

A high-temperature steel probe, suitable for use at temperatures up to 1,500° C is placed so that its tip projects into the flame a few inches from the fuel burner. A circuit is then established from an amplifier to probe, flame and burner metalwork. Amplified, the resultant current holds closed a relay, which in turn keeps open a semi-automatic type fuel valve.

The control unit for the installation is only 9¼ in. by 9¼ in. by 4¾ in. in size and contains two valves. Failure is to the safe—fuel off—position. The equipment is priced at £15 17s.

Handsomely Warm

GOOD looks are an attractive feature of the Ashby fire recently added to the range manufactured by the Arora Company, Rosebery St., Loughborough. This portable radiator is rated at 2 kW, and incorporates Arora C bars, which use a heavy duty tape element. A cream stove enamel finish is used for the sheet steel body, while the handle consists of a walnut coloured moulding. Dimensions are 18¼ in. high by 14 in. by 5¼ in. Listed as catalogue No. 402, the fire is priced at £4 19s. 6d., plus purchase tax. Supplies are expected to be available towards the end of this month.

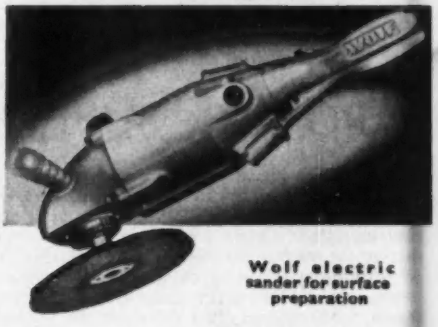
Arora portable fire

Extended use of R.F. Heating Set

IMPROVEMENT in the flexibility of the 4 kW r.f. heating equipment manufactured by Standard Telephones and Cables, Ltd., Connaught House, Aldwych, London, W.C.2, has been effected by introducing a modification in which the set can feed two work stations. Since each position has its own variable output water-cooled transformer, different types of work can be heated with power from the one generator. Work stations may be moved up to a maximum of 30 feet from their present generator.

Powered Sanding Tool

RECENTLY added to the range of power hand tools manufactured by Wolf Electric Tools Ltd., Pioneer Works, Hanger Lane, Ealing, W.5, is the horizontal sander shown in the illustration.



Wolf electric sander for surface preparation

A relatively highly powered motor is incorporated in the tool to combat the loss of cutting efficiency occasioned by falling off of speed as loading is increased. A bench rest and changeable hand grip are provided on the casing, a conveniently placed thumb-operated switch providing the necessary control.

In addition to sanding discs, a cup-grinding wheel, a wire brush and a felt rubbing pad are available as accessories.

Price Reductions

REDUCED prices for tumbler switches, switch plates, boxes, etc., are announced by Midland Electric Manufacturing Co., Ltd., Tyseley, Birmingham 11, as applicable from January 14 last. An illustrated catalogue issued by the firm lists the products affected, and a leaflet is available giving the new net trade prices.

TRADE PUBLICATIONS

FARM WIRING.—Interest is added to catalogue L "Farm Wiring System," of W. T. Henley's Telegraph Works Ltd., 51 Hatton Garden, London E.C.1, by the photographs included of typical installations.

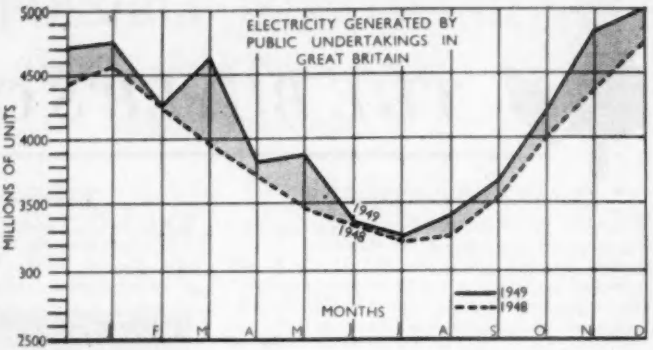
INSTRUMENTS.—Amongst recent publications received from Muirhead and Co. Ltd., Beckenham, Kent, are the following information bulletins :—B-641-A, describing a Duddell type oscillograph for use up to 1,000 c/s; B-644-A, dealing with an inductance bridge which avoids widely varying ratio arms; and B-645-A, a Wein type frequency bridge.

UNITS GENERATED

During the month of December, 1949, a total of 5,040 million units were generated in stations under the control of the B.E.A. and the North of Scotland H.E. Board as the corresponding figure last year was 4,696 million, the increase is 7·3%.

Of the total, 4,868 million units were generated in steam stations, and 151 million units by hydro-electric.

Energy sent out during the month was 4,766 million units, 94·6% of that generated. This gives the total for the calendar year 1949 as 46,324 million units, an increase of 5·5% on 1948.



POWER SUPPLY IN DECEMBER

LAST week we surveyed the new generating plant installed by the B.E.A., and we then gave details of the 308 MW total of generating sets installed during December. There was, during the month, no change in the total North of Scotland generating capacity.

Once more the energy generated is a record figure, 5,040 million units, of which the B.E.A. were responsible for 4,925 million units, or 98%. It is an interesting contradiction of popular ideas that the B.E.A. generated more energy by water power during December than did the North of Scotland undertakings—76 million against 75 million units.

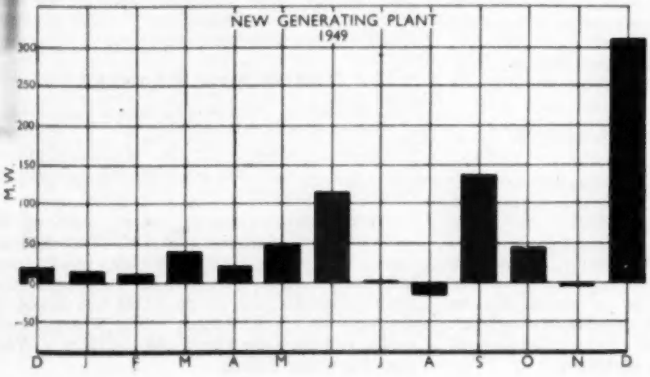
Units Generated, 1949

During the calendar year, 1949, a total of 49,115 million units were generated; 47,977 million by the B.E.A. and 1,138 million by the North of Scotland H.E. Board and the Lochaber Power Co. Units sent out were 45,203 million and 1,121 million respectively, giving 94·3% and 98·8% respectively of the totals generated. Overall, 5·5% more electrical energy was generated in Great Britain than in the year before, while the average amount of installed generating plant was 3·3% greater.

47,740 million units were generated in steam stations, and 1,174 million units by water power—a ratio of 40:1. While the steam total represents an increase of 6·1% on 1948, the dry weather has affected the operation of the hydro-electric stations, and they are 12·8% down on last year.

Diesel engine powered generators were responsible for 88·4 million units during the year, while the total amount of oil used, both for this purpose and for oil-fired boilers was 53,500 tons, an increase of 29·2% on 1948 figures. Coal consumption during the year was only 3·5% up, with a total of 28·9 million tons.

It is not generally realised how much energy for public supply purposes is generated in refuse destructors and waste heat plants. During 1948 the respective totals were 3 million units and 109·5 million units respectively.



GENERATING PLANT

At the end of December, the installed generating capacity of the B.E.A. was 13,588 MW, showing an increase of 308 MW during the month. The North of Scotland H.E. Board total has remained steady at 325 MW. Thus there has been during 1949 an increase in the combined total generating capacity of 687 MW, or 5·2%.

The installed capacity, used for the purpose of this graph, should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets which are connected on both steam and electrical sides and which are suitable for use.

THE WEEK IN NEWS

Switchgear Productivity Team Home

ANOTHER productivity team concerned with electricity—the second within a month—has just returned from an exhausting six-week tour of American industrial plants. The 14 members of the electrical starting and control gear team disembarked from the *Queen Mary* at Southampton yesterday, Wednesday.

Before they left America, members of the team expressed the opinion that British electrical engineering plant was as good as, if not better than, that of the United States as regards both specialisation and mass production. Safety regulations were more rigorously enforced in Britain and canteen facilities were better, although food was not so plentiful. On the other hand, American plants were more happily located and industrial lighting and heating was greatly superior.

The Productivity Team's workshop group study semi-automatic contact soldering at Square D. Co., Milwaukee

120 Papers for H.T. Conference

VALUABLE contributions on a.c. and d.c. transmission at voltages above 200 kV are among the 120 papers to be submitted at the thirteenth meeting of the International High Tension Conference. As previously, the conference will be held at the Fondation Berthelot 28 bis, Rue St. Dominique in Paris from June 29 to July 8. Air conditioning and a public address system is now being installed in the hall.

In accordance with past practice, the four sections of the conference will be discussed in rotation. Proceedings this year will commence with Section 3, "Operation, Protection and Interconnection of Networks," followed by Section 4, "Questions of General Interest," and Sections 1 and 2, "Generation, Transformation and Circuit Breaking" and "Construction, Insulation and Maintenance of Overhead Lines and Underground Cables."

The U.K. is submitting 16 papers, U.S.A. 16, France 20, Belgium 10, Sweden 12, and others by countries having an electrical manufacturing or supply industry. Technical visits will be arranged during the conference and afterwards organised study tours will take place. Pre-prints of all papers are to be sent in advance to all delegates registered before April 15.

Chairman of the C.I.G.R.E. British national committee is Mr. P. V. Hunter, and copies of bulletins and other information can be obtained from the hon. secretary, Mr. R. A. McMahon, Thorncroft Manor, Dorking Road, Leatherhead, Surrey.

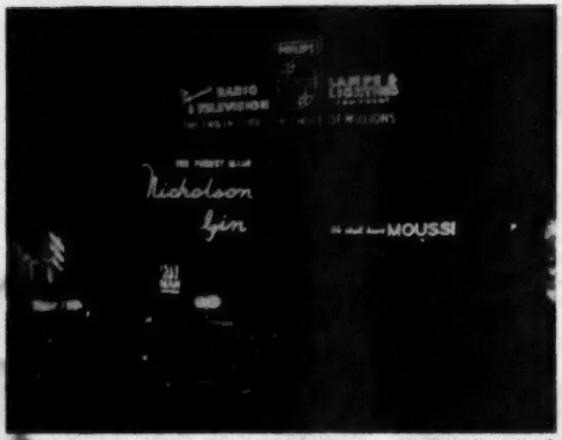
Turkey Orders Electrical Equipment

SO impressed was the Turkish Government with British mining practice and electrical equipment that a six-figure order for electrical gear has been placed with B.T.H. and Metro-Vick. Using machinery and electrical equipment for the first time Turkey plans to increase her annual coal production from four to seven million tons in three years. The machinery will be coming from America.

Under a British Council scheme, Mr. Hilmi Alozkan, a 29-year-old Turkish mining technician, has arrived in this country for instruction in maintenance of electrical equipment. He has already spent a week at B.T.H.'s mining department at Rugby.

The First Half Century

Those who look with alarm and dislike on the progress of municipal enterprise will be horrified at the latest proposal, hailing from Rochdale, namely that local authorities should be empowered to act as insurance companies for all property within their respective areas. I do not think there is the least likelihood of any such powers being conferred upon them, nor is it desirable that local authorities should engage in business, whether as fire or life insurance offices, but that the proposal has been made is an indication that there is something amiss with the present rates. The main argument for the proposal is that the ratepayers bear all the expense of the fire brigade and the insurance companies reap the benefit.—*From our issue of January* 18, 1900.



Philips' new Trafalgar Square neon sign in full illumination

Three-Colour Neon Flashes Nightly

NIGHTLY a new neon sign overlooking Trafalgar Square flashes five colourful variations. One of the largest and probably the highest in London, situated on Grand Buildings roof, it advertises Philips Electrical, Ltd. Total length of the sign is 102 feet and the centre-piece, Philips emblem, is 33 feet high.

Electrical engineers of London Signs and Illuminations, Ltd., took two months to fix 1,850 feet of neon tubing to the sign which was previously intended as a daylight advertisement when erected in October, 1948. Illuminations are in three colours, fluorescent white, blue and the new strawberry-coloured fluorescent neon red. The sequence of variations takes eighteen seconds from full illumination to black-out.

Guide for Industrial Film Sponsors

INCREASING popularity of industrial films for educational purposes has presented many manufacturers with a problem. So complex is the modern film that the layman can hardly be expected to understand the techniques of conception and planning or methods of accurately calculating the cost. Realising this, the joint publicity department of British Engineers Association and B.E.A.M.A. have published a "Guide to Industrial Film Making."

Detailed information on production and distribution is given and a helpful glossary of technical terms is included. Copies, price 2s. post free, can be obtained from British Engineers Association, 32 Victoria Street, S.W.1 or B.E.A.M.A., 36 and 38 Kingsway, W.C.2.

Rotarians' Exhibition

AN industrial exhibition with a difference—manufacturers' names were omitted on most stands—was a feature of London Rotary Club's luncheon in Connaught Rooms, W.C.2, last week. Held for the first time since before the war, the exhibition was arranged to show members "what the other fellow does for a living." Almost all sections of trade were represented, and several exhibits had an electrical engineering interest. Mr. R. Chaplin, Enfield Cables, Ltd., for instance, showed cross sections of cables, and electrical control equipment was demonstrated under the auspices of Mr. F. R. Unwin of G.E.C. Mr. J. Meech of Meech Electric Drives, Ltd., exhibited typical examples of industrial motors and a beautifully constructed model of a Babcock and Wilcox high head boiler was shown by Mr. A. R. Chapman.

Yorkshire Propose Tariff Revision

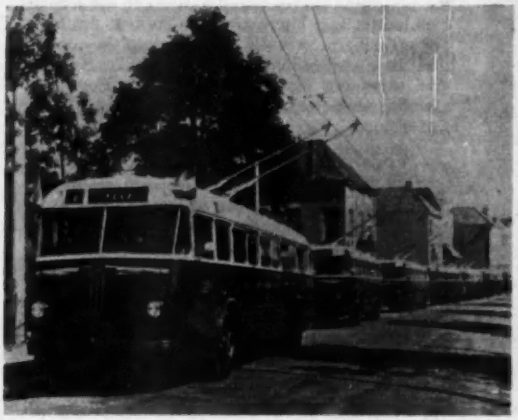
FIRST step in the work of standardising electricity charges to domestic consumers in Yorkshire area is shortly to be taken by that Board. Domestic consumers will be asked to declare the number and types of rooms at their premises. At present there are about 170 different tariffs in the area. The new tariffs will probably come into operation early next year.

Radio and T.V. Sales Steadier

SALES of radio receivers during November differed very little from the October figures, the average number sold per shop being 15·84 compared with 16·72. There was a slight increase in sales of television receivers over the same month, figures being 11·89 for November compared with 11·77. An interesting point revealed

East Grinstead Service Centre won first prize in the S. Eastern area competition with this window version of "The Magic Cave"

by R.T.R.A. sales index was that the average price per sale of radios increased because more radiograms were sold. Demand for television receivers is mainly for sets with a 12-inch tube. Thirty-six per cent. of radio and 31% of television sales were on hire purchase terms.



Some of the trolleybuses which English Electric Co. are supplying to Arnhem municipality

Ladder Struck Overhead Cable

A RIDER that danger notices on pylons carrying power lines should be not more than 12 ft from the ground, that the voltage should be stated and that notices should be on two sides of the pylon, was added to the findings of a Shipston coroner's jury. They returned a verdict of accidental death on a fifty-year-old bricklayer killed when his ladder touched an overhead cable.

Evidence was given that two men were erecting a calf-shed within three or four feet of a pole carrying three 11,000 V cables. While they were moving a 24 ft extending ladder, it struck a cable and one of the men was electrocuted. There was a steel wire running the length of the ladder. A danger notice on the pole was a foot or two from the top and on the opposite side to where the men were working. In his summing up the coroner commented that local authorities should check that new buildings were not erected too close to poles carrying power lines.

London Showrooms Change Opening Hours

LONDON Board hopes to open a further 23 service centres on Saturday afternoons. A memorandum on the Board's proposal has been submitted to the Consultative Council asking for its opinion. The move will bring the total number of London centres open on Saturday afternoon to 59 with 12 centres remaining shut because they are in buildings that close or in districts where there is no Saturday afternoon trading. Showrooms affected will close during the afternoons of the local early-closing day.

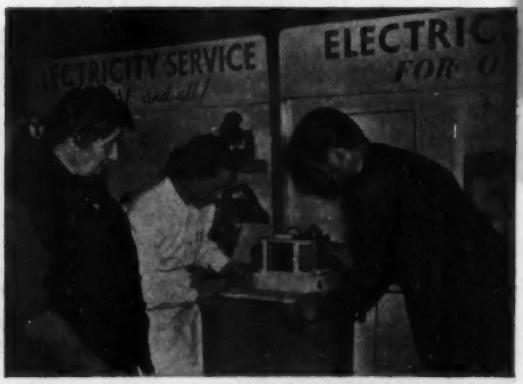
The Board points out that negotiations will have to be made with staff organisations for a staff rota system. Only this way will staff be employed on the most economical basis. Additional cost of Saturday afternoon opening is expected to be between £10,000 and £12,000.

Six of the seven sub-area committees of the Consultative Council agreed in principle to the move. Three suggested that it should be subject to an experimental period. Western sub-area, who dissented, said that in absence of any evidence of demand from consumers, no change in existing arrangements was recommended. At the full council meeting on Thursday members agreed to the proposal, but asked for a working report in six months, and a report of financial results in twelve months.

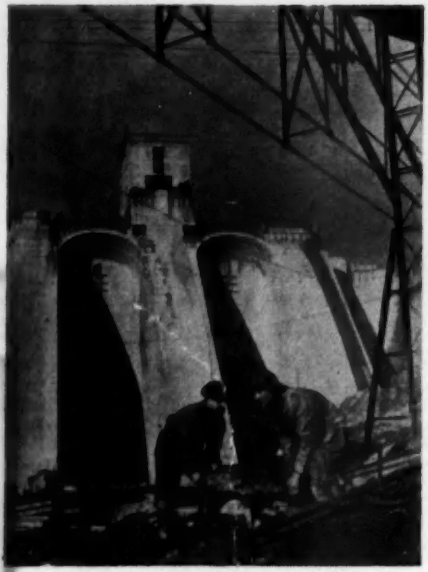
Dutch Like British Trolleybuses

A SECOND trolleybus route, from the town centre to Oosterbeek, has just been opened in Arnhem, Holland. Trolleybuses were first adopted for general use there in September, 1949, after the English Electric Co., Ltd., had obtained a contract for 18 chassis and electric traction equipments with the Arnhem Municipal Company. So popular are the vehicles that another 18 have been ordered.

The trolleybuses supplied are single deck "Overseas" type, 8 ft wide and 35 ft 6 in. long, providing accommodation for 37 seated and 33 standing passengers. An automatic lubricating system is fitted to simplify maintenance and the acceleration rate of the 120 h.p. motor is governed



Ministry of Food staff showed great interest in a Goblin "Teasmade" at an exhibition in Portman Court last week



Dam wall and control tower of Loch Sloy power station which is expected to come into operation next month

by a hydraulic type of automatic acceleration equipment. A 10 cu ft motor-driven air compressor supplies power for the brakes and the pneumatically-operated doors.

Route 2, coming into operation this year, will extend the trolleybus service from Hoogkamp-Arnhem-Vondellaan. The changeover will be completed when routes 3 and 5, Altveer-Station-Broek and Station-South Arnhem, are converted.

Contracts Awarded Without Tenders

SEVERAL councillors strongly protested at the last meeting of Derby Town Council against a recommendation that contracts worth £7,500 for electrical installations in Derby schools should be awarded to the East Midlands Board. Councillor A. Ling said the work was apparently to be carried out by the Board without tender. In expending such a large sum of money, any sane business man would have got competitive tenders.

Councillor H. J. T. Russell, vice-chairman of the education committee which made the recommendation, said alternative tenders had not been asked for because it was the policy of the council that the East Midlands Board should continue to give them the same service as the corporation electricity undertaking had. The recommendation was carried.

Foreign Firms Undercut by Half

GERMAN and Japanese electrical equipment prices undercut those of British firms by as much as 50%, commented the annual report of the Engineering and Metals section of the Manchester Chamber of Commerce, presented last week. Mr. F. J. E. Tearle, chairman, said that the anticipated advantages of hard currency markets had been offset by foreign competitors reducing their prices.

Canadian Standards Applications

APPLICATIONS for approval of British electrical appliances and machinery under the new Canadian Standards agreement should be addressed to the B.S.I. Detailed information will then be forwarded regarding the procedure to be adopted. B.S.I. address is 24/28 Victoria Street, London, S.W.1.

New Plant in 1949

IN the article under this heading which appeared in last week's ELECTRICAL TIMES, two errors occurred. The total plant installed in October should have been noted as 50.75 MW, and in December 308 MW. This makes the total for the year 826.25 MW.

Thirty members of Liverpool I.E.S. Centre saw manufacture of fluorescent lamps at Siemen's Preston factory during a recent visit

ELECTRIC SUPPLY NEWS

Doncaster

The public inquiry opened on Wednesday of last week, into the proposal of the B.E.A. to erect a new generating station at Crimpsall Ings, not far from Doncaster. Mr. E. Blain, for the Authority, stated that the site, which Doncaster Corporation had approved, provided fume washing apparatus was installed, was unique. An alternative site at Thorpe Marsh, which had been suggested, would add at least £500,000 to the capital cost and £40,000 to the annual charges.

The proposals of the B.E.A. provide for a station with, initially, two 30 MW turbo-alternators with four 180 klb/hr boilers, which would probably be doubled by 1955 or 1956.

When the inquiry was continued on Thursday, Mr. A. Barber, for Doncaster Civic Trust and the vicar and churchwardens of Doncaster Parish Church, claimed that the power station could be better sited away from the town, either at Thorpe Marsh or Barnby Dun. Injury to health and property would result, he declared, if, as had been admitted at the inquiry, 1¼ tons of grit and 2¼ tons of sulphur dioxide a day were thrown into the atmosphere over Doncaster. Mr. J. Lamb (Sprotborough Parish Council) stated that the beauty spot of the Doncaster district would be spoiled if a power station were sited at Crimpsall Ings. Mr. Blain claimed that grit and sulphur fumes would be diffused into the atmosphere and, from a high chimney, would fall probably 900 to 1,000 yards away from the power station.

The inquiry, which was closed, was conducted by Mr. A. N. East (chief engineering inspector, Ministry of Fuel and Power).

N. of Scotland

With work a little behind schedule, the first 32,000 kW turbine at the Loch Sloy generating station is not expected to be in operation until next month.

North Eastern

Addressing the North Yorkshire and South Durham Farmers' Union, Mr. T. E. Daniel, deputy chairman North-Eastern Electricity Board, stated that it was the Board's wish to complete the electrification of the North-East as soon as possible. A survey had been completed, and if other factors had not had to be considered, the Board would have been ready to start. The Government's request for the curtailment of capital expenditure had upset their plans and the present position was nebulous. At present it was not possible to say when rural electrification would be completed.

Orkneys

The first stone in the erection of the new Orkneys power station was formally laid last week by Mr. R. Walls, Orkney manager of the North of Scotland Hydro-Electric Board.

Southwick

The Urban District Council decided last week that houses could not be provided for the staff of the B.E.A.'s new generating station at Southwick. The council approved a recommendation that the B.E.A. be informed that, owing to a lack of building sites in the district, they could not see their way to provide houses for other than their own residents. The B.E.A. had asked that 200 houses be provided for their staff within the next five years in the five towns of Brighton, Hove, Portslade, Southwick and Shoreham.

Yorkshire

Arising out of questions by a member of the Brighouse Town Council, the secretary of the Area Consultative Committee has received a communication from the Yorkshire Electricity Board stating that the Board is proceeding to establish a standard domestic tariff and discount throughout the area. In view of the considerable investigation involved the introduction of a standard tariff would not be possible before 1951.

LIGHTING SCHEMES

Amersham.—Tenders have been invited for improved lighting in the High Street and Broadway.

Chingford.—The council has approved in principle to the replacement of gas street lighting by sodium lamps.

Eastbourne.—A scheme for decorative lighting has been submitted by the South Eastern Electricity Board. Capital expenditure would amount to £6,800, and running costs £564 p.a.

Finchley.—The town council has been recommended to apply for consent to the borrowing of £6,025 for the provision of sodium lighting for Regents Park Road and Ballards Lane.

Gateshead.—The T.C. is seeking M.o.T. approval to a scheme for electric lighting of Lobley Hill estate, at an estimated cost of £1,760.

Grantham.—The town's scheme for improved lighting is estimated to cost about £17,000. Under the new scheme there will be 316 gas lamps (against 484 at present) and over 500 electric lamps.

Hindley (Lancs.).—The U.D.C. has received sanction to borrow £2,000 for improved street lighting in Castle Hill and Bridge Street.

Loughborough.—The T.C. have in hand a scheme for lighting of the main road through the town at a cost of £3,000.

Lyme Regis.—The T.C. is to consider a scheme for improved street lighting submitted by the South Western Electricity Board.

Market Harborough.—Experimental fluorescent lighting is to be tried out in the Square.

St. Ives (Hunts).—The Town Council is considering changing over street lighting from gas to electricity.

COMPANY ACTIVITIES

Associated Engineering Holdings

For the year to September 30 last, consolidated profit amounted to £736,814 (*£802,610*). Normal depreciation absorbs £141,723 (*£125,819*), and additional £7,000 (*£79,910*), interest on loans £1,438 (*£2,960*), emoluments of directors of parent company £50,645 (*£53,536*), compensation to former director for loss of office £10,000 (*nil*), profits tax £100,150 (*£100,500*). To income tax, after adjustments relating to previous years £184,597 (*£230,291*), leaving consolidated net profit of £241,261 (*£209,594*), plus £93,821 brought in, making £335,082 available. To general reserves of subsidiaries £100,000 (*nil*), Preference dividend £7,342 (*same*), Ordinary interim 5%, £44,733 (*£67,100*), final 10%, £89,467 (£67,100), leaving £93,540 carried forward, of which £89,075 is in respect of the subsidiary. Consolidated current assets are listed at £2,301,397 (*£2,514,825*), including stocks £931,836 (*£886,958*), debtors £789,761 (*£730,063*), cash £434,527 (*£522,031*), and tax reserve certificates £144,500 (*£375,000*). Current liabilities amount to £886,954 (*£1,116,480*), including creditors £421,537 (*£505,476*).

Brecknell, Munro and Rogers

The directors announce that it is proposed to increase the capital to £250,000 by the creation of 500,000 4s. Ordinary shares. They point out that the recent 50% capital bonus has reduced the un-issued balance to £3,000. An extraordinary general meeting will be held on February 7, also to consider altering the memorandum and articles.

Cable and Wireless (Holding)

It is expected that a revised scheme for dealing with the £32,000,000 award will be published soon. The Ordinary Stockholders' Committee has disclosed that the committee unsuccessfully approached the directors of the company for consultation in considering proposals for a new scheme. The approach was made with the object of ascertaining certain information which was not apparent from the scheme put forward by the company at the meeting held on November 25. The committee propose to continue in its opposition. Last week-end the directors issued a statement to the effect that fresh proposals were being drafted and subject to certain minor details, were almost ready. They intend to discuss these with the Ordinary Stockholders' Committee very shortly.

English Electric Co.

At the extraordinary general meeting on Monday, approval was given to the raising of further capital by a public offer of Debenture stock and a rights issue to Ordinary stockholders. The Ordinary issue is of 589,789 £1 shares at 35s. each, in the proportion of one for every £6 of Ordinary stock held. The debenture issue is for £3,000,000 4% stock 1965-85. Both are being underwritten by Lazard Brothers. At the meeting Sir George Nelson referred to the continued expansion of the business. The 1948 figures, when available, would further emphasize this trend.

Hoover Ltd.

Resolutions for amending the winding-up rights of Ordinary stockholders and "A" Ordinary shareholders were approved at a meeting of the company last week. The scheme provides, *inter alia*, that after repayment of paid-up capital, Ordinary stockholders will be entitled to £5,000,000 and any residue will be divided as to threequarters to Ordinary and one quarter to "A" Ordinary.

Kalgoorlie Electric P. and L. Corpn.

The directors announced that the issue of 250,000 5% Convertible Redeemable debenture stock at par, underwritten by the Beaver Trust, has been fully subscribed. Letters of allotment were posted this week.

Mexican Light and Power Co.

Gross earnings for August (in Canadian currency) were $1,449,915 ($*1,397,818*), making a total from January 1, 1949, of $12,828,164 ($*14,246,122*). Expenses and depreciation for the month $1,417,564 ($*1,370,705*), aggregating $11,773,833 ($*13,259,496*).

Holders of the 5% First Mortgage bonds of the Mexican Light and Power Co. and of the Mexican Electric Light Co., at adjourned meetings in Toronto last week, agreed to extend the maturity of both issues from February 1, 1950, to July 1, 1950. This action had been requested by the companies in order to allow time for the plan of arrangement to be submitted to security holders of the group generally.

L. Sterne & Co.

Dividend of 15% (*same*). Profit for the year to October 31 was £73,792 (*£59,247*) after allocating £78,500 (*£74,000*) for tax, and £61,167 (*£47,170*) for depreciation. Transferred to general reserve is £40,000 (*£30,000*), leaving £52,970 (*£35,844*) carried forward. It is stated that the directors are offering a further 26,000 £1 Ordinary shares at 38s. each to existing shareholders in the proportion of one for every five held.

Dividends Declared

Bennis Combustion, Ltd.—Interim dividend 5%.

Broom and Wade.—Final Ordinary dividend of 15%, making 22½% (*same*). Net profit £305,631 (*£259,867*).

Reliance, Clifton Cables and Industrial Products, Ltd.—Interim dividend of 10% (*same*), payable on February 1.

Commercial Information

CONTRACTS OPEN

*The date stated is the last day for receiving tenders. Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, London S.W.1, quoting reference number.*

January 21.—Bootle T.C.—Six months' or twelve months' supply of electric cables, flexes and lamps from April 1. Borough engineer and surveyor, Town Hall.

January 21.—Newcastle-on-Tyne. T.C.—Six diesel fuel pumps, electrically operated, pre-set, 3-phase or single phase, a.c. 400-440 V. Frank S. Taylor, general manager, Manors, Newcastle-on-Tyne 1.

January 21.—Peterborough T.C.—Electric lighting and power installations to 76 houses on Dogsthorpe-Newark estate. F. J. Smith, city engineer and surveyor, Town Hall, Peterborough. Deposit £2 2s.

January 23.—Bedfordshire C.C.—Installation of electric light at North Bedfordshire College of Further Education, at Cauldwell Street, Bedford; for education committee. County architect, Shire Hall, Bedford. Deposit £2 2s.

January 23.—Carlisle T.C.—Electrical installation to 44 houses. City engineer and surveyor, 18 Fisher Street, Carlisle.

January 24.—New Zealand.—750 miles of tinned (or alternatively untinned) copper wire, New Zealand Post and Telegraph Department, Wellington. B.o.T. (CRE (IB) 38568/49).*

January 24.—Shrewsbury. T.C.—Electric lighting and power installations in 104 dwellings now being erected on Part 2 of Oakfield estate. Borough surveyor, Guildhall, Shrewsbury.

January 25.—Hertfordshire C.C.—Supply of electric lamps for one year, from April 1. Purchasing officer, The Old Rectory, Hatfield, Herts.

January 25.—Northa mpton R.D.C.—Electrica installation to 64 houses now in course of erection. R. J. Miller, architect, 1 Cheyne Walk, Northampton.

January 25.—Yeovil T.C.—Supply and erection of 35 25 ft and 23 15 ft steel electric light columns, including lanterns, lamps, control gear and wiring. Town clerk, Municipal Offices, Yeovil.

January 27.—Taunton T.C.—Electrical re-wiring and installation of new fittings at public library, Corporation Street. E. R. Tyzack, borough Engineer and surveyor, St. Paul's House, Taunton.

January 27.—Edinburgh T.C.—Electric light and power installation at Colinton Mains Temporary School. City architect, City Chambers, Edinburgh.

January 28.—South Africa.—Supply, delivery and erection of poles, line material, wire and cables, transformers and service connections. Village Management Board, Bonnievale, Cape Province. Deposit £2 2s.

January 28.—Manchester T.C.—Supply of stores including: (*a*) switches, etc., contact taps, condui tubing, insulation material, carbon brushes, overhead material; (*b*) cable (power and lighting), galvanised steel cable, electrodes, etc. General manager, Corporation Transport Department, 55 Piccadilly, Manchester 1.

January 30.—Gosport T.C.—Electrical goods for year ending March 31, 1951. Borough engineer, Town Hall, Gosport.

January 30.—Uruguay.—50,000 kgs of insulating paste for packing in underground armoured cable connection boxes. Usinas Electricas y Telefonos del Estado, Montevideo.

January 31.—New Zealand.—20 miles of triple flame-proof wire. New Zealand Post and Telegraph Department, Wellington. B.o.T. (CRE (IB) 38591/49).*

January 31.—New Zealand.—20,000 yards of power cable. New Zealand Post and Telegraph Department. B.o.T. (CRE (IB) 38567/49).*

January 31.—New Zealand.—Supply and delivery of hydraulic and electrical components for lifting gear for surge chamber gate at Lake Tekapo H.E. development scheme. Gear includes: 2 oil-hydraulic pumps, 25 gpm. at 200 lb/sq in. pressure; 27 oil-hydraulic valves, ¼ to 3 in. sizes, hand and solenoid operated, etc.; 2 oil pressure gauges; 2 vacuum gauges; 250 ft hydraulic pipes, ¼ in. to 3 in. sizes; 2 electric motors, 5 h.p., squirrel cage type. Stores manager, Ministry of Works, Government Buildings, Wellington. B.o.T. (Ref. CRE (IB) 36267/49).*

February 1.—Southwark T.C.—Annual supply of electric lamps. D. T. Griffiths, town clerk, Town Hall, Walworth Road, S.E.17.

February 1.—Manchester T.C.—Supply of 500 street lighting lanterns suitable for 250 or 400 W vertical burning mercury vapour discharge lamps, and 500 sets of chokes and condensers. City surveyors department, (Room 324), Town Hall, Manchester 2.

February 2.—Enfield.—Supply of electric lamps for Enfield Group Hospital management committee from April 10. Supplies officer, Chase Farm Hospital, Enfield.

February 3.—Belfast T.C.—Electrical apparatus and various accessories. Electricity Department, East Bridge Street, Belfast.

February 3.—Uruguay.—531,000 porcelain insulators (various types). Specification No. 3219, Usinas Electricas y Telefonos del Estado. B.o.T. (Ref. CRE (IB) 37583/49).*

February 3.—Tottenham T.C.—Supply of electric lamps. M. Lindsay Taylor, town clerk, Town Hall, Tottenham, N.15.

February 4.—Swansea T.C.—Electric lamps for public lighting for twelve months from April 1. Borough engineer and surveyor, Guildhall, Swansea.

Due to limitation of space, Overseas Contracts are only published twice in the above section. A complete list is available for reference at our offices

February 4.—Prestwich T.C.—Electric lamps and electrical equipment for 12 months ending March 31, 1951. Borough engineer, Town Hall, Prestwich.

February 6.—Chester T.C.—Electrical installation at Handbridge secondary modern school. City engineer and surveyor, Municipal offices, 43 Northgate Street, Chester. Deposit £2 2s. Advertised in December 15 issue.

February 8.—Crumlin R.D.C.—Supply of electrical pumps: two close coupled pumps, each capacity 7,500 gallons per hour against total head of 270 ft; two close coupled pumps, each capacity of 20,000 gallons per hour against total head of 25 ft; and two close coupled pumps, each capacity of 20,000 gallons per hour against total head of 200 ft. W. D. R. and R. T. Taggart, civil engineers, Castle Arcade Buildings, Belfast.

February 10.—Droitwich T.C.—Electrical installation in 218 council houses. G. L. Robinson, engineer and surveyor, Town Hall, Droitwich. Deposit £2 2s. Advertised in this issue.

February 14.—Birmingham T.C.—Electric wiring in huts at Billesley Common Camp, Yardley Wood, Birmingham 14. W. Smith, general manager, Estates Department, 19/24 Summer Road, Birmingham 3.

February 17.—New Zealand.—400 distributor suppressors and 400 spark plug suppressors. New Zealand Post and Telegraph Department, Wellington. B.o.T. (CRE (IB) 38564/49).*

February 17.—New Zealand.—Paper insulated telephone cable. New Zealand Post and Telegraph Department, Wellington. B.o.T. (CRE (IB) 38590/49).*

February 25.—Evesham T.C.—Supply and erection of 34 high pressure sodium electric discharge street lighting lamps on Bath-Evesham-Lincoln trunk road. N. F. Davies, town clerk, 3 Leicester Gables, High Street, Evesham. Advertised in this issue.

February 28.—S. Rhodesia.—Two 1,250 b.h.p. synchronous induction motors, r.p.m. at 50 c/s, 1,000 (alt. 1,500) for main pumping station, and two 850 b.h.p. synchronous induction motors, r.p.m. at 50 c/s, 1,000 (alt. 1,500) for booster station at Hunyani Poort pumping station. Town Clerk, Municipal Offices, Kingsway, Salisbury, S. Rhodesia. B.o.T. (CRE (IB) 37695/49).*

No date stated.—Felling U.D.C.—Electrical work for 70 houses at High Lanes, Heworth. Housing architect, D. W. Green, Council Offices, Felling, Co. Durham.

No date stated.—Kirkcaldy T.C.—Boilerhouse plant, central heating, electric light and power installation. Begg, Peebles and Ross, consulting engineers, 27 Rutland Square, Edinburgh.

No date stated.—Gipping R.D.C.—Supplying and fixing a submersible electric pump at pumping station, Winston. Surveyor, Council Offices, Needham Market, Ipswich.

CONTRACTS CLOSED

Manchester T.C.—Street lighting lanterns, REVO ELECTRIC CO., LTD.; hard-drawn copper wire, ABERDARE CABLES, LTD., and SCOTTISH CABLES, LTD.; twin L.C. and B.V.I.R. cables, SCOTTISH CABLES, LTD., and W. GIEPEL, LTD.; twin T.R.S. cables, BRITISH DRIVER HARRIS AND CO., LTD.; single V.I.R. taped and braided cables, GENERAL CABLE MANUFACTURING CO., LTD. Electrical installations in houses at Woodhouse Park and Moss Park, (183) A. E. SUDLOW AND CO., LTD.; (92) H. C. TAYLOR AND CO. (all recommended).

Newcastle T.C.—Electrical installation for houses at Bradwell, Clayton and Chesterton, MIDLANDS ELECTRICITY BOARD, £5,695 (recommended).

Railway Executive (Western Region).—Part contract for electric lamps from January 1 to June 30. METROPOLITAN-VICKERS ELECTRICAL CO., LTD.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Cape Electric Tramways, Ltd.—Resolution that all the undertaking and business of the company, having been transferred to the Cape Electric Tramways (1949), Ltd., the company be voluntarily wound-up, passed at a meeting on December 30. F. J. Pullen, 4 London Wall Buildings, Blomfield Street, E.C.2, appointed liquidator.

Aerolectric Mouldings, Ltd.—Resolution for voluntary winding-up passed at meeting on December 30. J. C. Burleigh, 33 King William Street, E.C.4, appointed liquidator.

Marson Electric Industries Co., Ltd.—W. C. Staward Waight, 179 High Street, Bromley, Kent, appointed liquidator.

Stanley Cooper, Ltd.—B. M. Patton, 84 Union Street, Torquay and P. W. Hart, 28 Baldwin Street, Bristol 1, appointed liquidators.

PRICES OF CABLE MATERIALS
(at Tuesday night)

COPPER, electrolytic	£153 0 0
LEAD, good soft pig (foreign) ...	97 0 0
" " "English" quality ...	98 10 0
TIN (99·99·75%) ... (Cash) ...	£599½—£600
" (3 months)	£583½—£583¾
ALUMINIUM, commercial purity (del.)	112 0 0
ARMOURING:	
Galv. Steel Wire (0.104 in.)	39 10 0
Mild Steel Tape (0.04 in.)	26 0 0

Note. Figures quoted are M.o.S. spot prices. For future prices the following premiums must be added:—

For Copper delivered in 2nd or 3rd month after order (per ton) ...	2 10 0
For Copper delivered in 4th, 5th and 6th month after order (per ton) ...	5 0 0
For Lead delivered in 2nd or 3rd month after order (per ton)	2 0 0

BUSINESS NOTICES

Changes of Address.—The office of the South Eastern Consultative Council has been transferred to 10 Queen's Gardens, Hove, 3. Telephone: Hove 9211.

The new address of the BRITISH INSTITUTE OF MANAGEMENT is Management House, 8 Hill Street, London, W.1. Telephone: Grosvenor 6000.

South Africa Imports.—The South African BOARD OF TRADE AND INDUSTRIES has received local representations for an increase in the duty on l.t. switch and fuse gear, comprising 15/100-amp fuses, 15/60-amp ironclad cut-outs, 15/60-amp switch fuses, 30/60-amp link switches, and 15/60-amp distribution boards. Any U.K. firm desiring to make representations concerning this matter should communicate with the Board of Trade, C.R.E., Dept. IC House, Millbank, S.W.1, quoting Ref. C.R.E. 505/50.

PROSPECTIVE BUSINESS

Ashington.—Improvements to cost £166,000 are planned for Ashington hospital by Newcastle Regional Hospital Board. P. H. Knighton, architect.

Bournemouth T.C.—Erection of flats in six blocks of 12 and erection of 27 houses on Kinson estate. Borough architect (Room 98), Town Hall, Bournemouth.

Bullingdon R.D.C.—Erection of 16 houses at Tetsworth. Architect, Harry W. Smith, 29 George Street, Oxford.

Carmarthen T.C.—Erection of 11 pairs parlour type "A" houses. 8 pairs parlour type "B" houses, 2 blocks of four parlour type "D" houses, 1 block of six parlour type "D" houses and 4 blocks of four flats. George L. Ovens. borough engineer and surveyor, Municipal Buildings, Carmarthen.

Crawley Development Corp.—Erection of 133 houses and 27 garages at the Corporation No. 1 site, Northgate, Crawley. Chief architect, Crawley Development Corporation, Broadfield, Crawley.

Durham C.C.—Additions to Darlington police station. County architect, Court Lane, Durham.

Durham C.C.—Erection of 46 houses on Sunderland Road estate. City Engineer, Town Hall, Durham.

Great Yarmouth T.C.—Erection of combined maternity and child welfare clinic at Middlegate Street. Borough engineer, Town Hall, Great Yarmouth.

Hampshire C.C.—Erection of proposed secondary school, Romsey Road, Winchester. County architect, The Castle, Winchester.

Hitchin U.D.C.—Erection of 28 houses on Purwell Lane estate, Hitchin, Office of the surveyor, Council offices, Brand Street, Hitchin.

Kendal T.C.—Erection of 50 houses at Hallgarth estate, Kendal. J. Barnfather, borough engineer and surveyor, Municipal Offices, Lowther Street, Kendal.

Leeds T.C.—Year's supply of illuminated bollards from April 1. L. R. Moir, highways engineer, 155 Kirkstall Road, Leeds 4.

Northampton R.D.C.—Erecton of houses comprising: 6 at Billing, 6 at Bradfield, 6 at Bugbrooks, 6 at Cogenhoe, 10 at Nether Heyford, 4 at Kislingbury, 6 at Quinton and Courteenhall, 12 at R ..de, 10 at Wootton and 6 at Yardley Hastings. Architect, R. J. Miller, Council Offices, 1 Cheyne Walk, Northampton.

Rugby R.D.C.—Erection of 10 houses at Bourton, 10 at Brandon and 6 at Birdingbury. Council's surveyor, 24 Warwick Street, Rugby.

Salford T.C.—Erection of pre-fabricated huts for St. Cyprians C. of E. School at Smith Street, Trafford Road, and West Liverpool Street primary infants' school on corner of Clarendon Road and Westminster Avenue. Architects, Holliday and Agate, 14 John Dalton Street, Manchester 2.

South Molton R.D.C.—Erection of 12 houses at Chumleigh. Council's architect, Mr. A. G. Oxland, 8 East Street, South Molton, N. Devon.

Sunderland.—Mission church planned for Bright Street. S. W. Milburn and Partners, The Esplanade.

Waterford C.C.—Erection of 20 houses at Park's Road, Lismore. Consultant architect, W. O. Morrissey, Thomas Street, Clonmel.

West Riding C.C.—Adaptation of decontamination station, Mirfield, as dental clinic. West Riding County architect, County Hall, Wakefield.

Widnes T.C.—Erection of block of six shops with three flats over, on Hale Road estate. T. A. Brittain, borough architect, Brendon House, Widnes Road, Widnes.

Workington T.C.—Erection of 8 shops and flats on Salterbeck estate. Borough engineer, H. Kay.

OVERSEAS OPPORTUNITIES

Canada.—Mr. F. W. Fraser, 62 High Street, Pictou, Nova Scotia, wishes to contact U.K. manufacturers of fractional h.p. motors, 1/6 to 1 h.p., 110 V, 60 cycle, single phase.

Greece.—M. C. Stamatopoulos and Sons, 58 Roosevelt Street, Athens, wish to be put in touch with U.K. manufacturers of electric motors, generators, transformers, water and steam turbines, boilers, electric cables, refrigerators, electric cookers, and electric appliances.

Iran.—Representation for electrical accessories and domestic electrical appliance manufacturers. Marand and Co. Ltd., Avenue Saadi, Tehran. B.o.T. (Ref. CRE (IB) 29105/49).

Portuguese East Africa.—Small hydro-electric plant. Messrs. Zuid Afrikaansch Handelshuis. P.O. Box NI. 471, Lourenco Marques. B.o.T. (Ref. CRE (IB) 31581/49).

YOUR QUERIES ANSWERED

"Thermaheat" electric blankets, makers of? R.G.P.—Sound, 483 Harlow Moor Road, Manchester 21. (17525)

"M.E.C." switchgear, makers of? S.E.B.—Mudie's Electrical Co., Ltd., Shaftmoor Lane, Birmingham 28. (17529)

Inspection lamp with a magnetic base, makers of? T.E.—J. Neale and Sons, 68 Graham Street, Birmingham. (17533)

"Cadea" irons, makers of? T.E.—These were made by C. and D. Electric (Appliances), Ltd., a firm which went out of business in 1949. (17537)

Small water-driven generators, makers of? D.L.—Gilbert Gilkes and Gordon, Ltd., Canal Iron Works, Kendal, Westmorland. Joseph J. Armfield and Co., Ltd., 66 Victoria Street, Westminster, London S.W.1. (17540)

Illuminated barbers' poles, makers of? B.B.—R. Hovenden and Co., Ltd., 29 Berners Street, London W.1. (17544)

Electrically operated water softeners, makers of? H.P.P.—Automatic Controls, Ltd., 237-9 Acton Lane, Chiswick, London W.3. O.C.P. Marketing Co., Ltd., Edgware Road, London N.W.9. (17548)

The above are selected from the questions we have answered this week. If you have a query, send it to us.

COMPANY REGISTRATIONS

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

A. H. Handy and Co., Ltd., 220 High Street, Lye, near Stourbridge. To acquire the business of electrical contractors, dealers in electrical appliances, printers, newsagents, etc., carried on as "A.H. Handy and Co." Cap.: £5,000. Dirs.: A. H. Handy and F. Allen.

Battery Service (Luton), Ltd., 25 Cardiff Road, Luton. Cap.: £1,000. Subs.: H. C. H. Archer and J. Warren.

Clark's Auto. Electrical (Sales and Service), Ltd., 46-48 Bridgegate, Retford, Notts. To take over the wholesale business of supplying and repairing automobile electrical equipment carried on at Retford by Charlie Clark and Son (Retford) Ltd. Cap.: £2,000. Dirs.: A. Clark and C. Lister Clark.

Cooke and Shepherd Ltd., 45 Northgate, Cleckheaton, Yorks. Electrical contractors, etc. Cap.: £500. Dirs.: E. T. Cooke, K. Cooke, G. Shepherd, and N. Shepherd.

Lloyd Lawrence Ltd., Dome Buildings, The Quadrant, Richmond, Surrey. General, constructional, mechanical and electrical engineers, etc. Cap.: £10,000. Dirs.: L. G. Lawrence and Mrs. M. Lawrence.

Francis X. Pichler, Ltd., 18 Cecil Square, Margate. Electricians, mechanical engineers, etc. Cap.: £1,000. Dirs.: F. J. X. Pichler and H. R. Coley.

M. S. Webb and Sons, Ltd., 196 High Street, Bromley, Kent. Electrical engineers and contractors, etc. Cap.: £1,000. Dirs.: M. S. Webb, R. M. Webb and A. W. Cox.

TRADE MARK APPLICATIONS

This information is extracted from the Official Journal by permission of the Controller.

Cargocaire. B677,250. Class 11. Air-conditioning apparatus. Cargocaire Engineering Corporation, 15 Park Row, New York City.

Dural. 679,367. Class 11. Component parts of installations for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, etc. James Booth and Co., Ltd., Argyle Street Works, Argyle Street, Nechells, Birmingham 7.

Hycap. 670,912. Class 9. Electric storage batteries, and parts thereof and fittings therefor. The Electric Storage Battery Co., Allegheny Avenue and 19th Street, Philadelphia.

Synchrofil. 679,365. Class 9. Mechanical and luminous advertising and display apparatus; and teaching and instructional apparatus. Synchrophone Ltd., 25 Haymarket, London W.1.

Synchrophone. 653,899. Class 9. Mechanical and luminous display apparatus for advertising purposes, sound reproduction apparatus, etc. Industrial Synchrophone Manufacturers, 25 Haymarket, London S.W.1.

Visor. 673,050. Class 11. Shades, reflectors and translucent covers, all being electric lighting fittings. The Benjamin Electric Ltd., Brantwood Works, Tariff Road, Tottenham, London N.17.

Vitamin Q. 676,937. Class 9. Electrical condensers. Sprague Electric Co. Inc., 210 Beaver Street, North Adams, Mass.

MEETINGS TO NOTE

THURSDAY, JANUARY 19

E.P.E.A. (Midland technical group).—"Power Stations, Past and Present." F. W. Lawton, Wolverhampton.—7 p.m.

Instn. Radio Engrs. (London section).—"The Performance and Stability of Permanent Magnets." A. J. Tyrell. London School of Hygiene, Keppel Street, W.C.1.—6.30 p.m.

I.E.E. (Irish section).—"Some Aspects of Agriculture and Horticultural Electrification in N. America." F. E. Rowland. Trinity College, Dublin.—6 p.m.

FRIDAY, JANUARY 20

I.E.E. (Southern centre).—Faraday lecture "Radar." R. A. Smith. Guildhall, Southampton.—6.30 p.m.

SATURDAY, JANUARY 21

I.E.E. (N. Midlands students).—Problems afternoon. Yorkshire Electricity Board Offices, Market Street, Huddersfield.—2.30 p.m.

MONDAY, JANUARY 23

I.E.E. (S. Midland Radio group).—"Printed Circuits, including Miniature Components and Sub-Miniature Valves." J. E. Rhys-Jones and G. W. A. Dummer. James Watt Institute, Birmingham.—6 p.m.

I.E.E. (N. Staffs. Sub-centre).—"The Performance of the British Grid System in Thunderstorms." J. S. Forrest. Electricity Showrooms, Stoke-on-Trent.—7 p.m.

A.S.E.E. (S.E. London branch).—"Electrical Contracting." W. F. Parker, S.E. London Technical College, Lewisham Way.—8 p.m.

TUESDAY, JANUARY 24

I.E.E. (N. Western centre).—"Electricity in the Cotton Industry." F. W. Cox and W. E. Swale. Engineers' Club, Albert Square, Manchester.—6.15 p.m.

Luton Electrical Soc.—"Television." D. Jackson. Luton Chamber of Commerce, George Street West, Luton.—7.30 p.m.

I.E.E. (N. Midland centre).—"Recent Developments in Comparative Methods of Testing A.C. Electricity Metres." S. F. Musson and R. E. Mell. Yorkshire Electricity Board Offices, 1 Whitehall Road, Leeds 1.—6.30 p.m.

I.E.E. (Scottish centre).—"Tidal Power and the Severn Barrage." H. Headland. Institution Engineers and Shipbuilders, 39 Elmbank, Glasgow, C.2.—7 p.m.

Electrical Assn. for Women.—"Teaching of Electrical Housecraft in U.S.A." Miss Gordon. Institution Electrical Engineers, Savoy Hill, W.C.2.—5.30 p.m.

WEDNESDAY, JANUARY 25

Inst. Radio Engrs. (West Midland section).—"The Performance and Stability of Permanent Magnets." A. J. Tyrrell. Wolverhampton and Staffs. Technical College, Wulfram Street, Wolverhampton.—7 p.m.

I.E.E. (Supply section)—"The Design, Specification and Performance of High Voltage Surge Diverters." H. F. Jones and C. J. O. Garrard. Institution, Savoy Place, W.C.2.—5.30 p.m.

I.E.E. (N. Midlands centre).—"X-rays in Industry." J. Goodyear. "Electrical Equipment of Docks." C. H. Nicholson. Lecture Theatre, Yorkshire Electricity Board, Ferensway, Hull.—7.30 p.m.

Hotel, Restaurant and Catering Exhibition.—Olympia. (Open until February 3.)

THURSDAY, JANUARY 26

Merseyside Elec. Lighting Services Committee—"Darkness into Daylight" (Demonstration and lecture). Dr. J. N. Aldington. Philharmonic Hall, Liverpool.—7.30 p.m.

A.S.E.E. (St. Albans branch).—"Power Factor." F. Buckland. George Hotel, George Street, Luton.—7.45 p.m.

FRIDAY, JANUARY 27

Jnr. Inst. Engrs.—"Electrical Distribution in Large and Small Workshops." R. J. Merralls, 39 Victoria Street, Westminster.—6.30 p.m.

More Power for Barnes

These pictures show work in progress on a large contract carried out by Henley's Contract Department for the B.E.A. in the Wandsworth-Barnes district, where the growing demand requires reinforcement of the 66 kV. transmission network. Henley's are specialists in super-tension cable technique, and their wide experience is available for any problem connected with power transmission.

HENLEY CABLES

Illustrations: Laying Henley 66kV Gas Cushion Cable on the Wandsworth-Barnes route.

Consulting Engineers:
Messrs. Merz & McLellan.

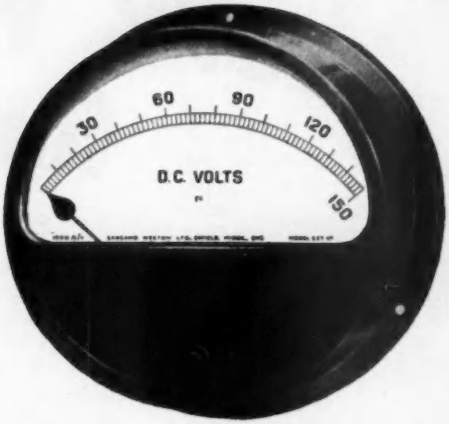
BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

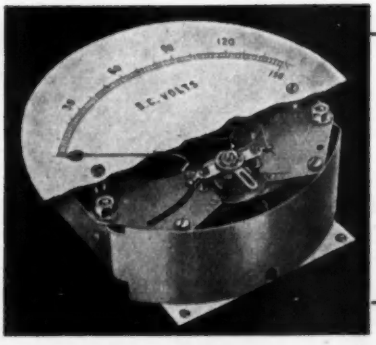
FEATURES OF WESTON SUPERIORITY

Weston

MOVING COIL SWITCHBOARD INSTRUMENTS



Combining the sensitivity of a laboratory instrument with the robust qualities of a switchboard pattern, this new series of 'Weston' permanent-magnet, moving coil instruments represents a great advance in design and technique. They incorporate thermocouples and rectifiers where necessary. Special features include efficient damping, the new standard 'Weston' patented spring-loaded jewel to protect the pivot, magnetic shielding and a high degree of accuracy. Mounted in attractive bakelite cases, flush fitting or projecting, the 6" easily read scale is printed in black on white enamel. All instruments conform to B.S.I. Spec. No. 89. Special enquiries will receive the personal attention of our Technical experts. The model S57 illustrated is supplied as a D.C. Microammeter, Milliammeter, Millivoltmeter, Ammeter and Voltmeter, all with a variety of ranges.



MAGNETIC SHIELDING. To prevent interference from external magnetic fields and to reduce those due to the instrument, it is magnetically shielded as shown. The high degree of accuracy of these instruments is in no small measure due to this 'Weston' design.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX • Telephone Enfield 3434 (6 lines) & 1242 (4 lines)

I 20

CLASSIFIED ADVERTISEMENTS

Official Tenders and Appointments · Situations Vacant · For Sale · Wanted

TENDERS INVITED

COUNTY BOROUGH OF GREAT YARMOUTH

CONTRACT FOR ELECTRIC CABLES

THE Council are prepared to receive Tenders for the supply of electric Cables for a period of one year from April 1, 1950, to March 31, 1951.

Specifications, Form of Tender and Conditions of Contract, can be obtained from the Borough Engineer's Office, Town Hall, Great Yarmouth.

Tenders upon the forms supplied, in plain sealed envelopes, endorsed "Tender for Cable" must be delivered to me not later than Wednesday, February 8, 1950

The Council do not bind themselves to accept the lowest or any tender.

FARRA CONWAY,
Town Clerk.

Town Hall, Great Yarmouth.
January 14, 1950. (D 426)

BOROUGH OF EVESHAM

SODIUM DISCHARGE STREET LIGHTING

TENDERS are invited for the supply, erection and putting into service of a system of high pressure Sodium Electric Discharge Street Lighting on a portion of the Bath-Evesham-Lincoln Trunk Road, the total number of lamps being 34.

Plans, Specifications and Forms of Tender may be obtained from the undersigned, and completed tenders in sealed envelopes endorsed "Street Lighting," should be returned not later than Saturday, February 25, 1950.

The Council do not bind themselves to accept the lowest or any tender, and the provisionally accepted tender will be subject to the approval of the Ministry of Transport.

N. F. DAVIES,
Town Clerk.

Town Clerk's Office,
3 Leicester Gables, High Street, Evesham.
January 14, 1950. (D 427)

CITY OF MANCHESTER

City Surveyor and Engineer's Department

TENDERS FOR THE SUPPLY OF STREET LIGHTING LANTERNS, ETC.

THE Highways Committee is prepared to receive Tenders for the supply of approximately 500 Street Lighting Lanterns suitable for either 250 or 400 watt vertical burning mercury vapour discharge lamps, and 500 sets of chokes and condensers required during the period ending December 31 1950.

Forms of Tender and general conditions may be obtained on application to the City Surveyor's Department (Room 329), Town Hall, Manchester 2, and Tenders, addressed to the Chairman of the Highways Committee, Town Hall, Manchester 2, are to be returned not later than 10 a.m. on Wednesday, February 1, 1950.

The Corporation does not bind itself to accept the lowest or any Tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester 2.
January 10, 1950 (D 375)

BOROUGH OF DROITWICH

INSTALLATION OF ELECTRICITY TO COUNCIL HOUSES

TENDERS are invited from competent electrical contractors for the installation of electricity in 218 Council houses at present lit by gas.

Forms of tender, general conditions of contract, specification and schedules of works may be obtained from Mr. G. L. Robinson, Borough Engineer and Surveyor, Town Hall, Droitwich, on payment of a deposit of two guineas (£2 2s.) which sum will be returned on receipt of a bona-fide tender, not subsequently withdrawn, and the return of all documents.

Tenders, in plain, sealed envelopes endorsed "Electricity Installation," must reach the undersigned not later than 12 noon on Friday, February 10, 1950.

The Council do not bind themselves to accept the lowest or any tender.

S. G. FOSTER,
Town Clerk.

Town Hall, Droitwich.
16.1.50. (D 434)

APPOINTMENTS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

NORTH WESTERN ELECTRICITY BOARD

No. 3 Sub-Area

ASSISTANT ENGINEERS (MAINS PLANNING AND CONSTRUCTION)

APPLICATIONS are invited for the appointment of Assistant Engineers (Mains Planning and Construction) at the No. 3 Sub-Area Headquarters.

Applicants should have had experience in the planning, construction and operation of large industrial and rural high voltage and low voltage networks, including both overhead lines and underground cables and sub-stations, and should be capable of estimating for and supervising the construction of such work.

The salary, which is provisional and subject to negotiations by the appropriate body, will be within the range of Grade 2 of the Board's scales, i.e. £525-£625 per annum.

Corporate or graduate membership of the Institution of Electrical Engineers or exempting qualifications will be an advantage.

Applications, stating age, education, qualifications and experience, present position and salary, should be received by the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, not later than February 4, 1950. (D 391)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the position of ACCOUNTANCY ASSISTANT (Superannuation).

The successful applicant should have experience in the maintenance of records, and have a good knowledge of superannuation procedure, preferably within the electricity supply industry.

The salary for this appointment will be within the interim salary range Grade "B," £450-£550 per annum, and will be subject to the successful applicant entering the authority's superannuation scheme.

Applications should be submitted on the official form of application which may be obtained from the Divisional Establishments Officer, at the undermentioned address, and should be returned not later than January 23, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (D 348)

BRITISH ELECTRICITY AUTHORITY

London Division

GENERAL ASSISTANT ENGINEERS

APPLICATIONS are invited for appointments as General Assistant Engineer in the Communications Section of the Technical Department.

Duties will be in connection with testing and maintenance of the Private Communications System, owned and maintained by the Authority, including equipment using Line, Teleprinter and Radio Techniques.

Applicants should have a Degree or Higher National Certificate in Engineering or equivalent and should preferably have had works experience. Scientific qualifications will be considered.

The commencing salary, which is provisional and subject to adjustment by the appropriate negotiating machinery, will depend on qualifications and experience, but will be within the range of £392 8s. p.a. to £523 13s. p.a. plus 5 per cent. or £25, whichever is the greater, as London Allowance.

The appointment will be superannuable under the terms of the British Electricity Authority's Superannuation Scheme.

Applications, giving full particulars of education, training and experience, should be forwarded to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller
(D 406)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 1 (Bradford) Sub-Area

CONSUMERS' ENGINEER (SKIPTON DISTRICT)
Vacancy No. 115/49

Applicants should have a good general and technical education and a wide experience in the commercial and engineering aspects of a district organisation. Experience in negotiations with all classes of consumers is essential.

Possession of the Higher National Certificate or its equivalent will be an advantage.

Provisional salary in accordance with the National Joint Board Schedule, Class "E," Grade 8, £449-£469 per annum, subject to negotiations with the appropriate organisations.

Applications, stating the above vacancy number, and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, within fourteen days of the appearance of this advertisement.

No. 2 (Huddersfield) Sub-Area

ESTIMATING AND CONTRACTING ENGINEER
(HALIFAX DISTRICT)
Vacancy No. 120/49

Candidates should have had a sound technical education and practical training, and must be capable of preparing and supervising schemes for all classes of industrial, commercial and domestic installations including specifications, estimates and tenders.

Provisional salary in accordance with the National Joint Board Schedule, Class "H," Grade 8, £520-£547 per annum, subject to negotiations with the appropriate organisations.

FEMALE DEMONSTRATORS
(HALIFAX, CLECKHEATON AND TODMORDEN DISTRICTS)
(Three Posts)
Vacancy No. 121/49

Candidates should be of school certificate or equivalent standard. They must have had experience in demonstrating electrical appliances and be capable of advising consumers on any matter relating to the use of electricity in the home. They must also have had experience in cooking practice and in general showroom duties.

Preference will be given to applicants holding the certificate of a recognised Domestic Science Training College, the Housecraft Advisors Diploma, the Certificate of the Electrical Association for Women, or equivalent qualifications.

Provisional salary within the range £270-20-£330 per annum, subject to negotiations with the appropriate organisations.

Applications, stating the above vacancy number, and giving full details of age, qualifications, training and experience, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, within fourteen days of the appearance of this advertisement.

No. 3 (Sheffield) Sub-Area

MAINS ASSISTANT (ROTHERHAM DISTRICT)
Vacancy No. 93/49

Applicants must have had a good general and technical education and experience in the mains department of a large supply undertaking. Such experience must include underground mains construction and fault location on 11 kV and l.t. mains and services. Overhead mains construction and operation experience will be an advantage.

Provisional salary in accordance with the National Joint Board Schedule, Class "J," Grade 8b, £494-£516 per annum, subject to negotiations with the appropriate organisations.

Applications, stating the above vacancy number, and giving full details of age, education, qualifications and experience, should be forwarded to the Manager, No. 3 (Sheffield) Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield 1, within fourteen days of the appearance of this advertisement.

No. 6 (Hull) Sub-Area

MAINS ASSISTANT (DRIFFIELD)
Vacancy No. 1/50

Applicants should have had a good general and technical education and operational experience on overhead and underground transmission and distribution systems in an extensive rural area.

Provisional salary in accordance with the National Joint Board Schedule, Class "F," Grade 8, £479-£497 per annum, subject to negotiations with the appropriate organisations.

Applications, stating the above vacancy number, and giving full details of age, education, qualifications and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Electricity Offices, Ferensway, Kingston-upon-Hull, within fourteen days of the appearance of this advertisement. (D 390)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following engineering posts in the Bristol and North Somerset Sub-Area of the Board, with headquarters at Bristol :—

(a) SUB-AREA CONSTRUCTION ENGINEER.—Provisional salary £805 p.a. (Class "M," Grade 6).

Candidates should have had considerable experience in all phases of construction work including U/G cables and O/H lines, switchgear and buildings, and be able to organise work and control men.

The successful candidate will be responsible for the organisation and co-ordination of all construction work in the Sub-Area, which will include phasing of work and supply of materials to meet load requirements, control of labour, maintenance of records and preparation of specifications and reports, etc. He may be required to partake in a standby rota for emergency duties.

(b) ASSISTANT CONSTRUCTION ENGINEER.—Provisional salary £682 p.a. (Class "M," Grade 8).

The successful candidate will be required generally to assist the Construction Engineer in the duties shown above and previous experience in such matters is essential. He, too, may be required to undertake standby duties.

For these posts, Corporate Membership of the I.E.E. will be an advantage. The salaries are provisional pending the adoption of nationally negotiated scales.

Applications to be submitted to Assistant Secretary (Establishments), Electricity House, Colston Avenue, Bristol 1, within ten days. (D 428)

MIDLANDS ELECTRICITY BOARD

Birmingham and District Sub-Area

APPOINTMENT OF ARCHITECTURAL ASSISTANT

APPLICATIONS are invited for the position of Architectural Assistant in the Sub-Area Engineer's Department.

Applicants should have received a recognised architectural training and should be conversant with the design and construction of industrial and commercial type buildings.

The appointment will be permanent and superannuable and the provisional salary in accordance with the National Joint Board Schedule, Class "O," Grade 10, at present £524 per annum will be subject to negotiation with such organisations as may be appropriate.

Applications, giving full details of experience, professional and technical qualifications, present salary and position held, should be endorsed "Architectural Assistant" and forwarded within 14 days to : Emil Braathen, Manager, Birmingham and District Sub-Area, 14 Dale End, Birmingham 4.

A. STEPHENS,
Secretary.
(D 433)

HIS MAJESTY'S COLONIAL SERVICE

A VACANCY exists for an ELECTRICAL AND MECHANICAL ENGINEER (CONSTRUCTION) in the Government electricity undertakings, Nigeria. Qualifications entitling applicants to consideration are associate membership of the Institution of Electrical Engineers, or degrees or diplomas recognised by that body as granting exemption from Parts A and B of its examination, and sound technical training and first-class experience in the construction of power stations, distribution systems and development works.

The appointed candidate will be required:—

(1) To carry out usual duties of a Resident Engineer supervising plant extensions in power stations, including turbo-alternator plant of up to 10,000 kW capacity, and associated boiler plant and ancillaries.

(2) To specialise on development work in rural areas and small townships.

(3) To assume responsibility for detailed layout, estimates, and programming, and for supervising the construction of the following:—

(a) E.h.t. overhead and underground extensions and sub-stations from existing supplies.
(b) E.h.t. and l.t. overhead and underground distribution systems for new undertakings.
(c) Power stations using steam-engined generating plant and water-turbines and the usual auxiliaries, control gear, etc. The capacity of the units installed will be up to 300 kW, but may exceed this in the case of water-turbine plant.

Applicants must be British subjects and physically fit. The successful candidate will be appointed on contract for one tour of 18 to 24 months. Salary, including expatriation pay, on the scale of £720 to £1,300 per annum, depending on age, war service and experience. Terms of appointment include furnished quarters at a rent of £60 to £150 per annum, outfit allowance of £60 on first appointment, home leave at the rate of seven days for each month of resident service, and free passages once each way, each tour, for the officer and, if married, for his wife.

Intending candidates should write at once to the Director of Recruitment (Colonial Service), Colonial Office, 15 Victoria Street, London S.W.1, stating age, professional qualifications and brief details of experience, quoting Reference No. 27324/9. (D 387)

SOUTH WESTERN ELECTRICITY BOARD

Exeter and East Devon Sub-Area

No. 1 (Exeter) District

APPLICATIONS are invited for the position of JOINTER (Class 1) at Exeter.

Candidates must be fully qualified and experienced Plumber/Jointers. A knowledge of 33 kV jointing would be an advantage.

Wages will be in accordance with N.J.I.C. Agreement, at present 35d. per hour for a 44-hour 5-day week.

Applications, stating age, qualifications and experience should be addressed to the undersigned and delivered not later than first post on Wednesday, February 1, 1950.

A. L. KEET, M.Eng., M.I.E.E.,
District Manager.

46 North Street, Exeter. (D 407)

BRITISH ELECTRICITY AUTHORITY

London Division

ENGINEERING DRAUGHTSMAN—
DEPTFORD GENERATING STATION

ENGINEERING DRAUGHTSMAN required at Deptford Generating Station, preferably one having had experience in draughting associated with power station mechanical and electrical plant.

Applicants should have received a good mechanical training and electrical knowledge is an advantage.

Salary will be in accordance with the qualifications of the successful candidate, with a maximum of £500 per annum. This salary is provisional and subject to negotiation with the appropriate organisation.

Applications, stating age, qualifications and experience, should be addressed to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, and be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(D 402)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of TRANSMISSION ASSISTANT (Cables) in the Transmission Department of Divisional Headquarters, at a provisional salary of £600 per annum.

The above salary is subject to negotiation through the appropriate National machinery.

Candidates should hold the Higher National Certificate in Electrical Engineering or equivalent, and should preferably be Corporate members of the Institution of Electrical Engineers. Considerable experience in the design, installation and maintenance of underground cables is necessary and knowledge of oil-filled and gas pressure cables up to and including 132 kV will be an added advantage.

The appointment is superannuable under the British Electricity Authority and Area Board's Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than Tuesday, January 31, 1950, in sealed envelopes endorsed "Transmission Assistant (Cables)."

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport, Cardiff.
January 10, 1950. (D 413)

SOUTHERN ELECTRICITY BOARD

No. 4 (Bournemouth) Sub-Area

APPOINTMENT OF ELECTRICAL DEMONSTRATOR (FEMALE)

APPLICATIONS are invited for the post of Electrical Demonstrator (Female) at Shaftesbury in the Yeovil district of the Board.

Applicants should be qualified to advise generally on the utilisation of electrical appliances, to give demonstrations in showrooms and in the homes of consumers, and to assist in showroom duties.

The appointment is subject to the provisions of a contributory staff superannuation scheme, membership of which is compulsory for those eligible to join.

The salary will be within a range of £270-£330 per annum, in accordance with Grade "A" of the National Joint Council's Extended Interim Scheme of Salaries for Administrative and Clerical Staffs, and the appointment will be subject to National Joint Council conditions of service.

Applications, on forms obtainable from the Sub-Area Secretary, at 1 Priory Road, Bournemouth, must reach him in envelopes endorsed "Electrical Demonstrator, Shaftesbury" in the top left-hand corner, not later than January 27, 1950.

F. W. KEMPTON,
Secretary.
(D 384)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

SENIOR DEMONSTRATOR

APPLICATIONS are invited for the above-mentioned position which will shortly become vacant.

Applicants must have sound education and possess Domestic Science Certificate as well as E.A.W. Diploma and Certificate.

The successful applicant will require to supervise and train demonstrators, give public demonstrations and to have a good knowledge of electrical appliances. The position will entail travelling throughout the Board's area as and when required.

The salary will be in the range £300-£450 per annum depending on qualifications and experience and subject to adjustment by the appropriate negotiating machinery.

Superannuation scheme applicable.

Form of application may be obtained from the undersigned and be lodged within 14 days of appearance of this advertisement.

W. D. D. FENTON,
Secretary.

16 Rothesay Terrace, Edinburgh 3. (D 411)

MIDLANDS ELECTRICITY BOARD

South Staffs. & North Worcs. Sub-Area

APPOINTMENT OF METER REPAIRERS (MECHANICIANS)

APPLICATIONS are invited for the above appointments at Sub-Area Headquarters, Toll End Road, Tipton.

Applicants should be conversant with the repair and overhaul of all types of electricity meters, including prepayment mechanisms and maximum demand indicators.

The rate of pay will be 35d. per hour for a 44-hour week, and conditions of service will be in accordance with the National Joint Industrial Council Agreement for the Electricity Supply Industry.

Applications, stating age, qualifications and experience, should be sent within 14 days to: Mr. T. G. Keeler, Sub-Area Manager, Midlands Electricity Board, Toll End Road, Tipton, Staffs.

A. STEPHENS,
Secretary.

January 19, 1950. (D 414)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the position of CLERICAL ASSISTANT in the purchasing department of the secretary's office.

The successful applicant should have experience in the buying of all types of electrical and mechanical parts and general stores as applied particularly to generating stations, transmission lines and sub-stations.

The salary for this appointment will be within the interim salary range Grade "B," £450-£550 per annum, and will be subject to the successful applicant entering the authority's superannuation scheme.

Applications should be submitted on the official form of application which may be obtained from the Divisional Establishments Officer, at the undermentioned address, and should be returned not later than January 23, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (D 349)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for the appointment of PLANT SPECIALIST (Overhead Lines) in the transmission design branch of the Chief Engineer's Department at Headquarters, in London. Applicants should have experience in the design, construction, testing and utilisation of overhead lines for high voltage power systems, preferably up to 132 kV. Special experience in the design and maintenance of steel tower types of construction is essential.

Applicants must have engineering and educational qualifications not below those required for associate membership of the Institute of Electrical Engineers.

The duties of the engineer appointed will include responsibility for new developments, analysis of results of service experience and advice on the application of new equipment.

The starting salary for the appointment will be determined according to the qualifications and experience of the selected applicant within the range £750-£1,250 per annum, and will be provisional until the final scale has been agreed with the appropriate negotiating organisations.

The appointment is superannuable and the successful candidate may be required to pass a medical examination.

Application forms may be obtained from D. Moffat, Director of Establishments, British Electricity Authority, British Electricity House, Great Portland Street, London W.1, and should be completed and returned to him not later than February 2, 1950. The information on the application form may be supplemented on separate sheets if the applicant so desires. Please quote reference AE/44.

(D 389)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Southern Sub-Area

HOUSECRAFT ADVISERS

APPLICATIONS are invited for positions as Housecraft Advisers in the Galashiels, Berwick and Hawick Service Centres at a salary within the range of £300-£320 per annum (dependent upon qualifications and experience). The salaries will be provisional and subject to adjustment when new scales have been negotiated with the appropriate organisations.

The duties will include the demonstration of electric cookers, washing-machines, refrigerators, and other electrical appliances in consumers' homes and the Service Centres and general showroom duties.

Candidates should preferably hold the Certificate of a recognised Domestic Science Training College.

Applications, stating age, education, qualifications and experience should reach the undersigned not later than fourteen days after the publication of this notice.

G. H. SANKEY,
Sub-Area Manager.

High Street, Galashiels, Selkirkshire. (D 424)

SOUTH WALES ELECTRICITY BOARD

AMENDED ADVERTISEMENT

APPLICATIONS are invited for the position of DISTRICT COMMERCIAL MANAGER, District 226 (Gorseinon, Kidwelly and Llanelly), in the West Central Sub-Area of the Board.

Applicants should have held a position of administrative responsibility in the development and organisation of electricity supply to all classes of consumers.

The salary for the position is provisional until such time as the final grading is determined by the appropriate negotiating machinery, and will be at the rate of £750 per annum.

Applications received in connection with the previous advertisement for this position will be considered, and such applicants need not submit a further application.

Applications stating age, qualifications, experience, present position, present salary, and whether married or single, together with names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Nr. Cardiff, so as to reach him not later than January 31, 1950. (D 399)

BRITISH ELECTRICITY AUTHORITY

London Division

COMBUSTION ENGINEER (SHIFT DUTIES)
TAYLORS LANE GENERATING STATION

APPLICATIONS are invited for the above position.

Applicants should have technical knowledge up to Higher National Certificate standard, including thermodynamics as a subject, together with a good knowledge of combustion.

Some electrical knowledge is also necessary together with a good standard of general education. Experience with high pressure boilers is essential.

Salary is in accordance with N.J.B. Schedule, Class "H," Grade 6b.

Applications, stating age, qualifications and experience, should be addressed to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1., to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(D 420)

BRITISH ELECTRICITY AUTHORITY

London Division

ASSISTANT ELECTRICAL MAINTENANCE ENGINEER
WEST HAM GENERATING STATION

APPLICATIONS are invited for the position of Assistant Electrical Maintenance Engineer at West Ham Generating Station.

Applicants should have served a recognised apprenticeship with a firm of electrical engineers manufacturing heavy high tension electrical equipment, e.g. switchgear, alternators, motors, controls, etc. Some power station or erection work experience would be considered an additional advantage.

Candidates should possess technical qualifications up to Higher National Certificate Standard.

Salary is in accordance with the N.J.B. Schedule, Class "J" Grade 8A.

The appointment will be superannuable under the terms of the British Electricity Authority and Area Boards Scheme.

Applications, stating age, qualifications and experience, should be addressed to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, to be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(D 405)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of an ASSISTANT ENGINEER (Sub-stations) in District 224 (Pontardawe, Ystradgynlais) in the West Central Sub-Area of the Board.

Applicants must possess at least the ordinary National Certificate in Electrical Engineering or its equivalent.

The salary for the position is provisional until such time as the final grading is determined by the appropriate negotiating machinery, and will be at the rate of £450 per annum.

Applications stating age, qualifications and experience, present position, present salary, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Nr. Cardiff, so as to reach him not later than January 31, 1950. (D 400)

AUSTRALIAN ENGINEER. A vacancy exists within the organisation of a well-known firm of engineers specialising in the design and installation of steam generating plants and associated equipment for a well-trained engineer having some considerable experience in the above field. He will be required to take up permanent residence in New South Wales, Australia, acting in the capacity of Assistant Resident Engineer in the first place, with the possibility of later promotion to the post of Resident Engineer in Charge of contract work on site.

Australian birth would be an advantage.

Applicants must be of the Higher National Certificate education standard and corporate membership of a recognised professional institution would be of benefit.

First-class passage for successful applicant and family to Australia would be paid together with expenses whilst in transit.

Salary according to age and experience, but not less than £A.750 per annum.

Detailed applications, stating age, previous experience, previous employers and technical qualifications to Box No. 1719, Electrical Times. (D 370)

CHIEF DRAUGHTSMAN required by manufacturers of electric control gear. Extensive knowledge of subject with ability to direct staff essential. London area.—Reply, with full details and salary expected, to: Box No 1703, Electrical Times. (D 328)

CHIEF ENGINEER required for F.H.P. Motor Division of a well-known manufacturing company situated in the North of England. Applicants should be experienced in electrical and mechanical design of a.c. and d.c. small F.H.P. motors and generators. Experience in lightweight construction an advantage.—Please reply in confidence, giving details of training and experience to: Box No. 1755, Electrical Times. (D 431)

COOKE AND FERGUSON LTD. require SENIOR AND JUNIOR DRAUGHTSMEN for interesting high voltage switchgear development projects. Good prospects for the right men.—Apply, stating age, experience, and salary required, to the Personnel Manager, Messrs. Cooke and Ferguson Ltd., South Street, Openshaw, Manchester 11. (D 323)

CORROSION ENGINEERS—preferably not over 35, required for Large oil company for Middle East duties for work connected with cathodic protection of thousands of miles of trans-desert pipelines and will include design, installation and operation of such protective schemes together with study of pipe coating procedure and materials. Post offers extensive opportunities in new field to man of initiative.

Candidates for acceptability should have Honours Degree in electrical engineering or physics or physical chemistry with strong backgrround of electricity and engineering and be able to combine first-rate theoretical background with bias to field work. Practical attitude and good knowledge of electro chemistry essential. Experience should include minimum of 5 years' work in industry.

The appointment would carry substantial allowances and would be at salary commensurate with general acceptability; the service is pensionable.—Write, quoting No. 443 to: Box No. 3248, c/o Charles Barker and Sons Ltd., 31 Budge Row, London E.C.4. (D 423)

DRAUGHTSMEN, electrical, with workshop experience. Preferably with knowledge of the design and detailing of small switch and fuse gear. Permanent position with superannuation scheme. Salary according to age and qualifications.—Apply, in writing, to: The Staff Officer, B.I.C.C. Ltd., Prescot, Lancs. (D 425)

DRAUGHTSMEN wanted with experience of layout and or design of automatic motor control gear and l.t. switchgear. Good prospects, good and cheap hostel accommodation available for unmarried men. A.E.S.D. rates. Location within 30 miles of Bristol (Somerset side).—Apply, stating age and experience, Box No. 1667, Electrical Times. (D 183)

ENGINEER requires ASSISTANT with switchgear experience in London (W.C.1) sales office, to assist in general office work and make drawings—mainly sketches. —Age, experience and salary required to Box No. 1745, Electrical Times (D 410)

ELECTRICAL Contractors, Lancs., require BRANCH MANAGER: must be fully experienced in estimating and handling any type of installation work, and to have had adequate practical experience or apprenticeship. Commencing salary commensurate with experience and ability, plus commission after probationary period. An opportunity for a really live and competent engineer to attain an established position. Applicants in the first place must give, in writing, full and precise details of training, technical qualifications, experience, age, salary required, etc. Lack of information may exclude further consideration.—Box No. 1763, Electrical Times. (D 440)

ELECTRICAL DRAUGHTSMAN required by large industrial concern, London area. Preference given to man with previous experience of plant layout and installation. Applicants should possess Higher National Certificate (Elec.). 5-day week. Permanent position for right type of man. Commencing salary £450 per annum according to qualifications.—Apply Box No. 1747, Electrical Times. (D 412)

ELECTRICAL INSPECTORS required by major oil company operating in Middle East. Applicants should have a wide experience of inspection and testing of motors, switchgear, and the electrical equipment associated with modern large generating stations, substations, and transmission and distribution networks with voltage range of 33 kV to 440 V. Knowledge of flameproof equipment an advantage. Possession of Higher National Certificate essential and qualifications up to A.M.I.E.E. desirable. Age limit 37 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, pension scheme, good leave arrangements.—Write, stating age and full details of qualifications and experience, quoting Dept. F.182, to Box 2333 at 191 Gresham House, E.C.2. (C 304)

ELECTRICIAN WIREMAN required, experienced in all systems.—Apply in writing, Giffords, Basingstoke. (D 271)

FERRANTI LTD. invite applications from well-qualified ENGINEERS with experience in the design, or operation, of special purpose metering equipment. The successful applicant is required to assist in formulating design policy and to take charge of a development section engaged in this type of work. He will also be required to give technical advice to customers and plan metering schemes to meet individual requirements. The position is one of great interest and carries prospects of promotion. Salary will be in the range of £800 to £1,300 per annum.

Application forms from the Staff Manager, Ferranti Ltd., Hollinwood, Lancs. (D 364)

FLUORESCENT Lighting Fittings Manufacturers producing extensive range of industrial fittings require additional REPRESENTATIVES with established entree to large users and contractors. Experience of illumination essential. Only men with proved sales record and used to substantial earnings considered.—Box No. 1715, Electrical Times. (D 343)

JUNIOR DRAUGHTSMAN required for detail and assembly drawing, modifications and schedule preparation for manufacturers of electro-mechanical devices in West London area.—Write full details of experience and salary required to Box No. 1731, Electrical Times. (D 382)

METHODS ENGINEER required with practical knowledge of modern assembly methods on mass and batch production by manufacturers of small electro-mechanical devices. Experience in motion study essential. Age 35-45. West London area.—Full particulars and salary required to Box No. 1733, Electrical Times. (D 383)

OIL refinery specialists require a professionally qualified ELECTRICAL ENGINEER capable of taking charge of a section dealing with all phases of electrical engineering, including equipment, power, lighting and instrumentation. A sound knowledge of electrical codes and full experience in the above type of work is necessary.—Box No. 1725, Electrical Times. (D 374)

OLD-ESTABLISHED London firm of electrical insulating engineers require REPRESENTATIVE for Manchester area; good prospects for right applicant.—Write, stating age, full details of experience and salary required, to: Anglo-American Vulcanized Fibre Co., Ltd., 21 Bath Street, London, E.C.1. (D 315)

OUTSIDE SALES ENGINEER for power factor correction capacitors, London and Home Counties. Salary and commission, depending on qualifications.—Secretary, Bryce Electric Construction Co., Ltd., Hackbridge, Wallington, Surrey. (D 331)

REPRESENTATIVE by leading manufacturers of Electric Cookers and Domestic Electrical Appliances for the London area. Applicants, who should have first-class sales qualifications and connections especially with London wholesalers, are requested to submit full particulars. This post, which is permanent, will be remunerated by salary, commission and expenses. Applicants should possess their own motor-car.—Box No. 1749, Electrical Times. (D 408)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

OLD-ESTABLISHED Electrical Contractors, Westminster, require a competent STOREKEEPER.—Applications in writing, together with details of age, experience, etc., to Box No. 1765, Electrical Times. (D 441)

REPRESENTATIVE by leading manufacturers of Electric Cookers and Domestic Electrical Appliances to cover the territory as defined by the South-Western Electricity Board, and preferably to be resident in the Bristol area. Applicants, who should have first-class sales qualifications and connections, are requested to submit full particulars. This post, which is permanent, will be remunerated by salary, commission and expenses. Applicants should possess their own motor-car.—Box No. 1751, Electrical Times. (D 409)

REQUIRED for sugar factory in Peru, general ELECTRICAL ENGINEER. Young, preferably unmarried. Salary £50 monthly, with house, etc., provided.—Applications, with full details, to Box No. 1737, Electrical Times. (D 393)

REQUIRED immediately capable ESTIMATOR for paper cable manufacturing company in the home Counties. Good salary and prospects. Excellent canteen available. Applications treated in the strictest confidence.—Box No. 1593 Electrical Times. (C 786)

SENIOR DRAUGHTSMAN with machine and assembly shop training; design experience of industrial electric control gear essential. South East London area.—Reply, with full details and salary expected to Box No. 1705, Electrical Times. (D 329)

SENIOR ELECTRICAL ENGINEER required for duty in Middle East areas of large oil company. Applicants must be chartered electrical engineers with administrative experience and considerable practice in the layout, operation and maintenance of h.t. and l.t. systems from generation through to industrial and domestic installation. Desirable age limit 40. Salary (incremental) from £1,000, plus allowances £140-£450, according to family circumstances; free furnished quarters/messing. Biennial (paid) home leave. Married applicants must be prepared to serve singly for first three years. Write, in full, quoting No. 438 to: Box No. 3243 c/o Charles Barker and Sons, Ltd., 31 Budge Row, London E.C.4. (D 422)

SWITCHGEAR DRAUGHTSMAN. Capable senior required for contract work on h.t. metalclad gear. Full details of experience and technical education to South Wales Switchgear, Ltd., Blackwood, Monmouthshire. Salary commensurate with ability. House available. *(Advertisement by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947).* (D 258)

THE Brush Electrical Engineering Co., Ltd., has vacancies for experienced SWITCHGEAR DRAUGHTSMEN for design, development or contract work. Permanent position with good prospects of promotion and excellent staff conditions. Men with good drawing office experience willing to be trained in switchgear engineering will be considered.—Applications, giving details of experience and salary required, to the Technical Director, Loughborough. (D 404)

WELL-KNOWN electrical accessory manufacturers require a REPRESENTATIVE to cover B.E.A. areas, South Western, East Midlands, Midlands and South Wales, and one to cover Scotland and Northern Ireland. The duties of the person engaged will be to call on electrical contractors, B.E.A. officials, housing authorities, manufacturers, etc., to introduce the company's products. Car owner an advantage. Salary £400 p.a., plus commission and expenses.—Apply Box No. 1739, Electrical Times. (D 396)

33 AND 11 kV SWITCHGEAR DESIGN ENGINEERS required. Permanent situations. Houses available.—Applications, giving full details of experience and qualifications, also commencing salary required, to Box No. 1699, Electrical Times. (D 308)

APPOINTMENTS WANTED

BRAZIL. ELECTRICAL ENGINEER-CONTRACTOR would welcome permanent post or three-year minimum tour that country on construction work, etc. Fluent Portuguese, 10 years' residence (school and business) in Sao Paulo State; understands Brazilian temperament and country's manners. Single, perfect health, and energetic. Varied technical and commercial experience in Britain New Zealand, and Australia also. Personal interview in first instance preferred.—Box No. 1689, Electrical Times. (D 268)

BREAKDOWN ELECTRICIAN seeks situation; 16 years' experience fault location and repair of all types electrical plant, drive; travel anywhere. Resident North London.—Box No. 1757, Electrical Times. (D 432)

ELECTRICAL ENGINEER requires situation; 22 years experience in all aspects of industrial electrical power equipment. Summerfield, 25 Steele Road, Isleworth, Middx. (D 292)

ENGLISHMAN just returned from Colonies, 44, married, seeks new post in U.K. Experienced administration and sales, backed by wide technical knowledge of lighting, electronics, household equipment, etc.—Box No. 1721, Electrical Times. (D 371)

MANUFACTURERS' AGENT, A.M.I.E.E., A.M.I.Mech.E., established 15 years, domestic appliances and public lighting, switchgear, valuable contacts, national boards, public authorities, and the trade. Operational area, Yorkshire and Lancashire. Only a first-class association considered.—Box No. 1691, Electrical Times. (D 273)

WORK WANTED

A.C. and d.c. ELECTRIC MOTOR REWINDS AND REPAIRS. Prompt service, fully guaranteed. Phone EDGware 8631 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE ROTOR AND STATOR WINDING. We specialise in the repair and rewind of all types of electrical machines from fractional h.p. upwards. Special departments for vacuum cleaners, dryers, portable tools, etc. All work fully guaranteed.—Walter Crane, Greencoat Electrical Works, Westgate, Wakefield. Telephone 2172. (A 4)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (D 326)

COIL WINDING and SMALL TRANSFORMERS, to any specification. Coils and transformers rewound—Avon Transformer Co., 20 Heath Terrace, Leamington Spa(C774)

ELECTRIC MOTOR manufacturer offers WINDING CAPACITY up to 500 hours per week. Fractional and up to 5 h.p. d.c. and a.c. Also transformer or coil-winding. A.I.D. approved firm.—Small Electric Motors Ltd., Eagle Works, Beckenham, Kent. (D 380)

SMALL progressive firm desires contract work, ARMATURE AND STATOR WINDING, ASSEMBLY, TURNING considered. Competitive prices; high-class workmanship guaranteed.—Box No. 1729, Electrical Times. (D 379)

ZEROS REFRIGERATORS.—Complete range of repair and service now available. Equipment reconditioned to conform to pre-war manufacturers' specifications.—Time Engineers, Refrigeration Specialists, 60 Southend Road, Rainham, Essex. Tel.: Rainham 2358: or Southern Area Agency. Tel.: Springpark 4217. Electrical Spares supplied to the trade. (A 639)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. 'Phone: Chiswick 5105. (A 20)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London S.W. Phone: WHitehall 9621/2/3. (A 3)

SEAM WELDING MACHINE wanted, circumferential or longitudinal.—Write, full details, price, Sunex, Ltd., Sunniside Works, Pallion, Sunderland. (D 418)

STAINLESS STEEL, SHEET, BAR AND TUBE, bought for cash.—Taylor Stainless Metals, Ltd., Slough, Bucks. Tel. 21381. (C 800)

WANTED.—D.C. and a.c. ball-bearing MOTORS.—Full details to Britannia Manufacturing Co., Ltd., 22/26 Britannia Walk, London N.1. (A 13)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady St., Bethnal Green, E.1. (A 1)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London, E.C.1. (A 16)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling.—Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

45-50 H.P. MOTOR and STARTER required, 400-500 r.p.m., a.c. 400/440 V, 50 c/s, 3-phase. Must be new or guaranteed second-hand. 90 h.p. similar motor can be given in exchange.—Victoria Veneer Mills, Ltd., Victoria Park Wharf, Old Ford Road, E.3. (D 284)

75 H.P. ELECTRIC MOTOR, 3,000 r.p.m. Offers will be considered for machines 400 V, 3-phase, 50 cycles, squirrel cage. Alternatively 440 V d.c.—Box No. 1735, Electrical Times. (D 388)

AGENCIES

SWEDEN. Old-established wholesale business in Stockholm seeking Sole Agencies for novelties within the ELECTRIC FEEBLE-CURRENT LINE. Will manufacturers interested please communicate with The Brexim Overseas Corporation, Ltd., 19-20 Grosvenor Place, London, S.W.1. Tel.: Sloane 2475. (D 429)

FOR SALE

Eighth Sale. *By Order of the Minister of Supply.*

G R

KINGS NEWTON (six miles south of Derby).
SALE OF 500 LOTS OF CLOTHING
INDUSTRIAL, ELECTRICAL AND MISCELLANEOUS EQUIPMENT AND STORES
including:

Coles five-ton Mobile Crane, Ace Mobile Cranes, Ingersoll Rand and other Compressors, 10RB Buckets, Jibs, etc., Dust Extractors, 19RB Injectors, Ambulance Train and Loco Spares, Internal Combustion Engines, Palaphone 22 kW Generator Set, Compressor Spares, Electric Motors, Electric Cable, Lead Acid Accumulators, Tread Compound, Blow Lamps, Carpenters' and other Tools, Waterproof Covers, Binoculars, Lifting Jacks, Spanners, Wrenches, Driving Chain Spares, Water Pump Assemblies, Radiator Cores, Pedal Cycles, Boots and Shoes, Vests, Stockings, Shirting, Silk and Nylon Canopies, Clothing Salvage, Green Hessian, Blankets, and a large quantity of other clothing and miscellaneous stores.

To be Sold by Auction by

W. S. BAGSHAW & SONS

at

M.O.S. DEPOT, NO. 103, KINGS NEWTON, MELBOURNE, NEAR DERBY
at 10.30 a.m.,
ON THURSDAY, FEBRUARY 9, 1950.

View days, Tuesday and Wednesday, February 7 and 8, 1950, from 1) a.m. to 4 p.m. each day and also on the morning of the sale up to 10.30 a.m.

Admission by catalogue only, price 6d. each (P.O. only), to admit 2 persons to view and 1 person on sale days.

Auction Offices: HIGH STREET, UTTOXETER, STAFFS.
Tel. No.: Uttoxeter 44 (2 lines).
Also at Ashbourne, Bakewell, and Derby. (D 347)

CABLES & WIRE

ENAMELLED AND INSULATED COPPER WIRE, first makes only, gauges from 10-44, ex stock, well below today's prices.—Alreco, The Almex Recovery and Refining Co., Ltd., 1-3 Robert Street, W.C.2. Temple Bar 0902. (D 430)

PAPER INSULATED ARMOURED CABLES to BSS 480/1942. Considerable stocks available.—Cable Jointers, Ltd., 49 Avenue Road, W.3. Acorn 4831/2. (D 319)

PAPER insulated lead covered and armoured POWER CABLE to B.S.S. 480/1942, 660 V. Unused and manufactured by the best makers. At the following bargain prices. All drums of 500 yds. each.

0·15	4-core P.I.L.C. and S.	£325 per drum
0·1	4-core P.I.L.C. and S.	£305 .. ..
0·04	4-core P.I.L.C.S.W.A. and S.	£205 .. ..
0·0225	4-core P.I.L.C.S.W.A. and S.	£155 .. ..

Write for full details to Messrs. Lipton Products, Ltd., Phoenix Works, Lamprell Street, Bow, E.3. (D 305)

P.V.C. CABLES, 1,044 red and black, 250 V single 35/- per 1,000 yd. Suitable for wiring, aerial or lead in wire. Special quotations for quantities. — Kershaws, Pershore St., Bromsgrove Street, Birmingham 5. (C 251)

TINNED STEEL ARMATURE BINDING WIRE. All even numbered sizes from 16 s.w.g. to 28 s.w.g. supplied on 7 lb. 14 lb. reels.—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (C 417)

TOUGH RUBBER CABLE available, all sizes and types; non-standard lengths (25 yds to 50 yds). Special prices quoted for regular buyer. Must be a user. Guaranteed strictly to BSS.7.—Box No. 1741, Electrical Times. (D 401)

DOMESTIC APPLIANCES

FRIGIDAIRE REFRIGERATING PLANT. Compressor driven by 1½ h.p. Century motor, 3-ph. 350 V, 50 c/s, operating two forced air blowers. At present maintaining temperature 40° F in 1,300 cu ft box, but capable of handling larger capacity. Ideal for milk, fish, fruit or cold beverage trades. Price arranged on inspection at Keens (Watford), Ltd., Mariborough Road, Watford. (D 322)

HEAVY BRASS BELL-PUSHES for 230 V, 15 doz. in five patterns to clear at 5/- each.—Edward Tayler & Co. (Bishopsgate) Ltd., 146 Bishopsgate, E.C.2. (D 377)

IMMERSION HEATERS. Grubb 2 kW and 3 kW standard voltages, all lengths, 12 in. to 36 in. Also 4 kW (non-taxable), 16 in. to 36 in. Fully guaranteed and immediate delivery. For illustrated brochure, latest lists, and trade terms, write distributors, John Owner and Co., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

4 CONVECTION HEATERS for sale, Standard and Poachin, 400/440 V, 3 oh. Photo, etc.—Edwards, 359 Euston Road, London, EUSton 4681. (D 435)

ENGINEERING PLANT & MATERIALS

FOR SALE, Gravity Spiral Roller Conveyors and Belt Conveyors Spiral diameters outside 124 inches, inside 70 inches, ball-bearing rollers.—Particulars apply Box. No. 1743, Electrical Times. (D 403)

ALUMINIUM ALLOY, Special offer: 6ft. x 3ft. x 24 gauge flat or corrugated sheets, £9 9s. per dozen. Also angles available. All prices carriage paid. Delivery ex-stock.—Sawyers Manufacturing Co., Ltd., Bures, Suffolk. Tel.: Bures 361/2. (D 395)

LADDERS (wooden and aluminium, all types), Trestles, Steps, Handcarts, etc., from Ramsay and Sons (Forfar) Ltd., Forfar (Tel. 172). (C 603)

MICANITE. First quality, 12in. x 12in. x ⅛in. Several cwts. for disposal cheap.—Box No. 1713, Electrical Times. (D 341)

RECONDITIONED CONVEYOR BELTING for sale, 6 in. to 30 in. wide, guaranteed, greatly reduced prices. Immediate delivery.—Full particulars to: Geo. Moxon (Mining) Ltd., 111 Watson Road, Worksop, Notts. (D 394)

GENERATING PLANT

ALTERNATORS, modern ball-bearing machines almost equal to new, 400 V, 3-phase, 50 c/s, 4-wire, 1,500 r.p.m., with inbuilt exciter, two 22·5 kVA "Metro-Vick" and four 28·1 kVA "Crom-Park." Prompt dispatch.—For full details please write: Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347). (C 793)

DISPOSAL of Power Station Plant for quick delivery. Two 7,500 kW TURBO ALTERNATORS by British Thomson-Houston, each of the impulse type, with a 2-stage Curtis wheel and 7 impulse stages, fitted with stainless steel and bronze blading and designed for use with steam at 180/200 lb per sq in., 550/574° F. temperature exhausting to a vacuum of 28 in., speed 3,000 r.p.m. and direct coupled on combined baseplate to 9,400 kVA. Alternator: 3-power factor, 6,300/6,600/3/50 with exciter. The surface condenser by W. H. Allen, has cooling surface of 15,500 sq ft and is fitted with special brass tubes. Motor-driven circulating pump and condensate pump are fitted together with 2-stage steam jet air ejection. Auxiliary electric supply is 400/440/3/50.

Four Babcock and Wilcox WATER TUBE BOILERS, C.T.M. type, evaporation 50,000 lb. per hour each at 350 lb. per sq in. working pressure. Each complete with superheater, economiser, chain grate stokers, coal chutes, forced and induced draught fans, air heaters and accessories. Heating surface of each boiler, 8,245 sq ft; superheater heating surface, 3,135 sq ft; grate area, 256 sq ft; economiser heating surface, 4,907 sq ft; air heater, 14,000 sq. ft. Induced draught fan, 45 in. diam; forced draught, fan, 30 in. diam.

George Cohen, Sons and Co., Ltd., Wood Lane, London W.12 (Tel.: Shepherds Bush 2070), and Stanningley, near Leeds (Tel.: Pudsey 2241). (D 396)

TWO screen-protected, d.c., horizontal-spindle, continuously-rated GENERATORS, each 10 kW, 110 V, as a compound wound machine, 10 kW, 145 V, as a shunt-wound machine; speed, 1,000 r.p.m. Provided with two end bracket-type grease-lubricated ball and/or roller bearings, terminal box for plain cable, and free shaft extension. One 3-panel, open, flat-back type SWITCHBOARD. Two Automatic Starters, driven by two McLaren Ricardo diesel oil engines, type L.M.R.2, cylinder Nos. 30150, A & B, each complete with flywheel and guard, governor, water circulating pump, fuel filter, radiator with fan, and guard, lubrication oil cooler mounted on radiator, lub. oil filter, exhaust manifold silencer, exhaust pipe, air cleaner. This equipment is brand new and can be inspected at Tallington, Stamford, Lincs., by appointment through Dow-Mac (Plant and Transport), Ltd., Tallington, Stamford, Lincs. Peterborough 4501. (D 256)

UNUSED DIESEL GENERATING SETS. Two each 362 kVA CROSSLEY PREMIER/E.C.C., comprising horizontal supercharged four-cylinder, four-stroke engine, makers Type LO4, output 435 h.p. supercharged, 340 h.p. normal working. Direct coupled to alternator 400/440/3/50 running at 250 r.p.m.

Three each 275 kVA ALLEN-MATHER AND PLATT Sets comprising vertical, eight-cylinder, four-stroke, 355 h.p. engine direct coupled on combined steel bedplate to alternator running at 600 r.p.m.; alternator has "V" belt-driven exciter mounted above. At present wound for 3,300 V, 3-phase, but can be rewound for 400/440 V.

Two each 187.5 kVA NATIONAL/BRUSH Sets, comprising vertical, six-cylinder, four-stroke, 240 h.p. engine direct coupled on cast iron bedplate to alternator 400/440/3/50, running at 600 r.p.m.

Two each 169 kVA CROSSLEY/BRUCE PEEBLES Sets, comprising vertical, four-cylinder, four-stroke, 200 h.p. engine, direct coupled on combination fabricated steel baseplate to alternator 400/440/3/50, running at 500 r.p.m.

Two each 150 kVA BLACKSTONE/CROMPTON PARKINSON, comprising vertical five-cylinder (12-hour duty), 185 h.p. engine (one-hour rating), direct coupled on fabricated steel baseplate to alternator 400/3/50, running at 500 r.p.m.

One 150 kVA BLACKSTONE/MET/VICK, comprising vertical, five-cylinder (12-hour duty), 185 h.p. engine (one-hour rating), direct coupled on fabricated steel baseplate to alternator 400/3/50, running at 500 r.p.m. Used 80 hours only.

Note: These Diesel Sets can be offered with switchgear for controlling them, operating in parallel with necessary synchronising equipment.

George Cohen, Sons and Co., Ltd. Wood Lane, London W. 12 (Tel.: Shepherds Bush 2070) and Stanningley, near Leeds (Tel.: Pudsey 2241). (D 397)

DIESEL ALTERNATORS in stock, 1 and 3 phase, standard voltages.—Details post free on request.—Thos. W. Ward Ltd., Albion Works, Sheffield. Tel. 26311 (ex. 347). (C 792)

100 kVA modern DIESEL ALTERNATOR SET, vert. 6-cyl. cold start diesel engine on baseplate coupled to 400/230 V. 3-phase, 50-cycle, 1,000 r.p.m. alternator. Details on request.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347) (C 796)

LIGHTING EQUIPMENT

CANDLE LAMPS, 25 and 40 watts, olive and twisted clear, frosted, and coloured. All caps. Liberal discounts to wholesalers and electrical trade. Wholesalers can have their own name candle lamp which carries a guarantee.—Thos. Handley and Co., Ltd., 74 Wellington Street, Leeds 1. (B 582)

ELECTRIC LAMPS, 25 to 200 watts 110, 200, 210, 220 and 240 V. Also Candle Lamps, 230 and 250 V, 25 watts, from stock at very favourable prices.—High Duty Plastics Ltd., Devonshire Road, Carshalton, Surrey. (D 381)

QUANTITY "Belling-Lee" (A.M. ZC2580) CARTRIDGE FUSE-HOLDERS, with 250 m/a CARTRIDGES, packed two in carton, 66 per gross, sample dozen 12/- Post paid.—Richards Specialities, 56 Southgate Street, Leicester. (D 378)

40-WATT FLUORESCENT CHOKES	18/6 each
Two-way METAL-CLAD SPLITTERS	5/- ,,
30-amp METAL-CLAD SWITCH FUSES	5/- ,,
15-amp 3-PIN SWITCH PLUGS AND BASES	10/- ,,
TRIPLE POLE SWITCH FUSES	10/- ,,
15-amp PORCELAIN FUSES	9/- doz.
GALV. CHAIN for fluorescent fittings	4/- doz. yds.

Post and packing extra. Cash with order.—Winco Industries, 17 Stretford Road, Manchester 15. Phone Moss Side 1364. (D 385)

METERS

AC/DC. SLOTMETERS (prepayment meters), all types and sizes. We supply Electricity Boards and Govt. Depts. If you need reliable instruments write to: Brent Electrical Co., 6 Holmdale Gardens, Hendon, London, N.W.4. (A 15)

A. C. and d.c. Quarterly and Prepayment METERS.—Electric Meter Co., Melville Lane, Torquay. (D 416)

HOUSE SERVICE METERS, from 5s. Guaranteed two years.—Electric Meter Co., Melville Lane, Torquay. (D 417)

HOUSE SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

METERS, a.c and d.c., new and reconditioned, all types. Quarterly, single and 3 phase, 3 and 4 wire, 2½ to 1,000 amp. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amps. M.D.I., Billiards Switches, Rent Collectors. Prices from 5s. Carriage paid, two-year guarantee, immediate delivery.—Illustrated catalogue from The Electric Meter Company, 16 Melville Lane, Torquay. (D 415)

MOTORS & STARTERS

A. ELECTRICAL CO. — For A.C./D.C. MOTORS SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

A. C. and D.C. MOTORS, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). (A 10)

A. C. and D.C. MOTORS, GENERATORS, from stock. —Service Electric Co., Ltd., Secomak Works, Honeypot Lane, Stanmore, Middx. Edgware 8631/4. (A 476)

A. C. and D.C. MOTORS, etc., new and rebuilt. Fully guaranteed. Send for stock list.—Lewis Electric Motors, Moor Works, Maidenhead, Berks. Tel.: 2388. (A 63)

BRAND new A.C. MOTORS, 1/3 h.p. to 90 h.p., 400/440 V, 3-phase, 50 cycles, 750, 1,000, 1,500 r.p.m. Squirrel cage and slip ring, with or without control gear. Immediate despatch ex stock. Attractive prices. Full details on request.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347). (C 794)

ELECTRIC MOTORS, GENERATORS, TRANSFORMERS A.C. & D.C.

STARTERS, SLIP RING & D.C., SEMI-AUTOMATIC

Any voltage, new, short delivery, all types of revolving electrical power.

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London N.W.9.
Telephone: COLindale 4621/2. (D 17p)

INDEX TO ADVERTISERS

Alton Battery Co., Ltd. 16
Aluminium Wire & Cable Co., Ltd. 3
Attwater & Sons, Ltd. 58
Automatic Coil Winder & Electrical Equipment Co., Ltd. ... 35
Auto. Light Controlling Co., Ltd. 70

Babcock & Wilcox, Ltd.... ... 1
Baker Metal Stopper Co. Ltd. ... 66
Belmos Co., Ltd. 5
Berry's Electric, Ltd. 53
Bestfrend Electrical Co., Ltd. ... 74
B. & H. (Nottingham), Ltd. ... 68
Brentford Transformers, Ltd. ... 12
Britannia Batteries, Ltd.... ... 8
Brit. Ins. Callender's Cables, Ltd. 11
Brit. National Electrics, Ltd. ... 61
Brit. Thomson-Houston Co., Ltd. 50, 78
Brook Motors, Ltd. 69
Brush Electrical Engrg. Co., Ltd. 59
Burco, Ltd. 65

Cable Makers Association ... 26
Chloride Batteries, Ltd. ... 21
Clifford, Charles, & Son, Ltd. ... 58
Contactor Switchgear, Ltd. ... 15
Cressall Mfg. Co., Ltd. 4
Crompton Parkinson, Ltd. 9, 55

Davenport Engrg. Co., Ltd. ... 68
"Diamond H" Switches, Ltd. ... 60
Downes & Davies, Ltd. 54
D. P. Battery Co., Ltd. 54

Edwards, F. J., Ltd. 74
Electro Mechanical Mfg. Co., Ltd. 31
Engrg. & Lighting Equip. Co., Ltd. 72
English Electric Co., Ltd. ... 24
Erskine, Heap & Co., Ltd. ... 28

Ferguson, Pailin, Ltd. 32
Ferranti, Ltd. 14
Foster Transformers & Switchgear, Ltd. 23

General Electric Co., Ltd. 36, 38
Grubb Engineering Co., Ltd. ... 4

Harboro Rubber Co., Ltd. ... 56
Hart Accumulator Co., Ltd. ... 62
Hartley Electromotives, Ltd. ... 64
Heatrae, Ltd. 20
Henley's, W.T., Telegraph Works Co., Ltd. 39
Higgs Motors, Ltd. 10

Imperial Chemical Indust., Ltd. 52
Isenthal & Co., Ltd. 4

Johnson & Phillips, Ltd. 13

Lancashire Dynamo & Crypto, Ltd. 76
Londex, Ltd. 72
London Electric Wire Co., and Smiths, Ltd. 51
Longlamps, Ltd. 72
Low, Duncan, Ltd. 62
Lundberg, A. P., & Sons, Ltd. ... 19

MacDonald & Co. (Publishers), Ltd. 66
Metro-Vickers Elec. Co., Ltd. ... 18
Metway Elec. Industries, Ltd. ... 68
Micramatic, Ltd. 60
Midland Electric Mfg. Co., Ltd. ... 49

Nalder Bros. & Thompson, Ltd. 33
Newton Bros. (Derby), Ltd. ... 56
Northern Aluminium Co., Ltd.... 67

Oldfield Engineering Co., Ltd.... 74

Parmiter, Hope & Sugden, Ltd.... 77
Partridge, Jones & John Paton, Ltd. 6

Resinoid & Mica Products, Ltd.... 64
Reyrolle, A., & Co., Ltd.... ... 71
Rozalex, Ltd. 56
Runbaken, Ltd. 74

Sanders, Wm., & Co. (Wednesbury), Ltd. 64
Sangamo Weston, Ltd. 40
Santon, Ltd. 57
Saxonia Elec. Wire Co., Ltd. ... 70
Scholes, George H., & Co., Ltd.... 66
Scottish Cables, Ltd. 63
Siemens Electric Lamps & Supplies, Ltd. 75
Simplex Electric Co., Ltd. ... 2
Standard Tele. & Cables, Ltd. ... 34
Statter, J. G., & Co., Ltd. ... 17
Sterling Cable Co., Ltd.... ... 29
Stirling Boiler Co., Ltd. 22
Superheater Co., Ltd. 70

Thermolectrics, Ltd. 72
Thorn Electrical Industries, Ltd. 27
Thorpe, F. W., Ltd. 74
T.M.C.-Harwell (Sales), Ltd. ... 25

Venner Time Switches, Ltd. ... 73

Wakefield, C. C., & Co., Ltd. ... 7
Westinghouse B. & S. Co., Ltd.... 30
Wootton & Co., Ltd. 70

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel.: 7232. (A 12)

ELECTRIC MOTORS. A large number of fractional h.p. d.c. Motors, 1/10th h.p., 1/50th h.p., 1/80th h.p. 110 V. and 220 V.—John Walton and Co. (Castleside), Ltd. Metalex Works, Great Cambridge Road, Enfield, Middx. Enfield 3425. (D 260)

FOR ELECTRIC MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (C 296)

FOR Sale, d.c. ELECTRIC MOTOR, 3 h.p., 230 V, 1,300 r.p.m., in good running order, complete with starter.—Box No. 1727, Electrical Times. (D 376)

FIVE 1/4 h.p., six 1/3 h.p., 400/440V, 3-phase a.c., 50 cycles, 1,400 r.p.m., T.B.T. MOTORS, unused. Offers invited.—Sloan Electrical Co. Ltd., 41 Kingsway, W.C.2. (D 392)

TOTALLY enclosed A.C. MOTORS, new and reconditioned, 1 to 30 h.p., 400/440 V, 3-phase, 50 cycles, 750, 1,000, 1,500 r.p.m. Immediate despatch ex stock. Attractive prices. Full details on request.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347). (C 795)

WE have in stock a wide range of electric MOTORS and STARTERS up to 3 h.p. Reasonable prices) What offers?—John Shaw and Sons (Honley) Ltd., Honley, Huddersfield. Telephone: Honley 22. (B 413-

220 H.P. B.T.H. Slip Ring MOTOR, 400/440 V, 3-phase, 50 cycles, 365 r.p.m., on baseplate with O.I. circuit breaker, cont. and res.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347). (C 797)

350 H.P. G.E.C. Slip Ring MOTOR, 400 V, 3-phase, 50 cycles, 375 r.p.m., on baseplate with Ellison O.I. starting gear.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex. 347). (C 798)

SWITCHGEAR

BRAND new. One Ellison 8-panel SWITCHBOARD, comprising two 300-amp and two 600-amp breakers, two 900-amp A.B. isolators, one 900-amp A.B. section switch, and space for 300-amp breaker for use on 400 V, 3-phase 4-W supply. One Ellison 2-panel SWITCHBOARD, comprising one 300-amp and one 150-amp breakers. One Ellison ditto, comprising one 600-amp and one 150-amp breakers. Palmer, Riley and Co., Ltd., Accrington. (D 421)

MERCURY SWITCHES are made by Hall Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London, N.22. Tel.: Bow 7221. (C 175)

UNCLASSIFIED

A.C. and D.C. MOTORS (all ratings) up to 350 h.p. • ALTERNATORS. GENERATORS. GENERATING SETS, TRANSFORMERS, WELDING PLANT. PLATING EQUIPMENT. CONTROL GEAR, SWITCHGEAR, PORTABLE ELECTRIC TOOLS, etc.—Write for current electrical stock list, post free.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Tel. 26311 (ex. 347). (C 791)

TRANSFORMER, 400 kVA, 6,600 V to 400 V, 3 phase, by Foster Engineering Co. Perfect condition.—Further details from B. Winstone and Sons, Ltd., 150/2 Clerkenwell Road, E.C.1. (D 419)

100 SUNVIC Glass Seal THERMOSTATS, Type 2.C-L.G. Set for 90° C., fitted with S.B.C.—Gresham Transformers Limited, Buying Dept., Twickenham Road, Hanworth, Middlesex. Phone Feltham 2271/4. (D 393)

BUSINESSES FOR SALE

ESTABLISHED ELECTRICAL RETAIL, CONTRACTING, RADIO, AND TELEVISION Business, coastal town, Essex. Modern shop and flat. No electrical restrictions, low rental. Quick sale, £1,000. Stock, at value, includes 1947 Ford van. Bargain. Accounts, figures.—Box No. 1753, Electrical Times. (D 425a)

MISCELLANEOUS

A.M.I.E.E., City and Guilds etc. on "NO PASS—NO • FEE" terms. Over 95% successes. For full details of modern courses in all branches of Electrical Technology send for our 176-page handbook. FREE and post free. B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (D 344)

RICHARDS AND PARTNERS, assoc ated with George Offord and Co., Auctioneers and Valuers of PLANT AND MACHINERY AND INDUSTRIAL PROPERTY, Granville House, Arundel Street, London W.C.2. Tel: TEMple Bar 7471 (A 23)

NOW AT NEW LOWER PRICES

SECRETS OF SWITCHCRAFT

AND QUICK DELIVERY TOO

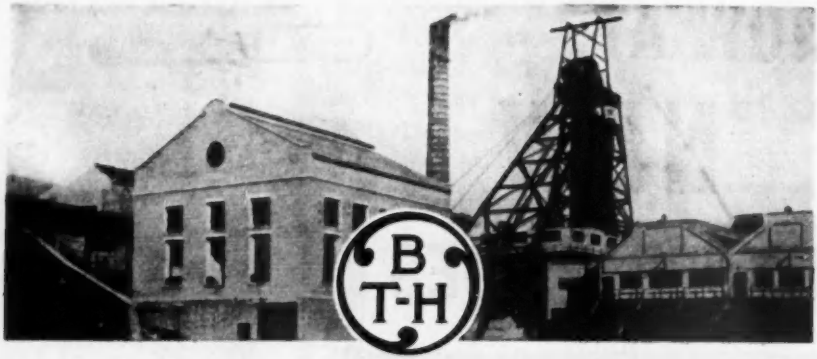
You can order MEM tumbler switches now at still lower prices and be certain of getting quick delivery. We couldn't offer such fine switches at such low prices if we didn't make every part ourselves—even the porcelains—in our own high efficiency factory. If you haven't tried them yet, send for a sample dozen without delay.

Send for list No. 302 for full details of the range—5 amps, 250 volts, one and two way, surface, semi-recess and flush mounting—also flush plates and wood and iron boxes.

MEM Switch, fuse and motor control gear, electric fires and localised lighting equipment

MIDLAND ELECTRIC MANUFACTURING CO. LTD., BIRMINGHAM 11

Branches in London and Manchester



Electric Equipment for Mining

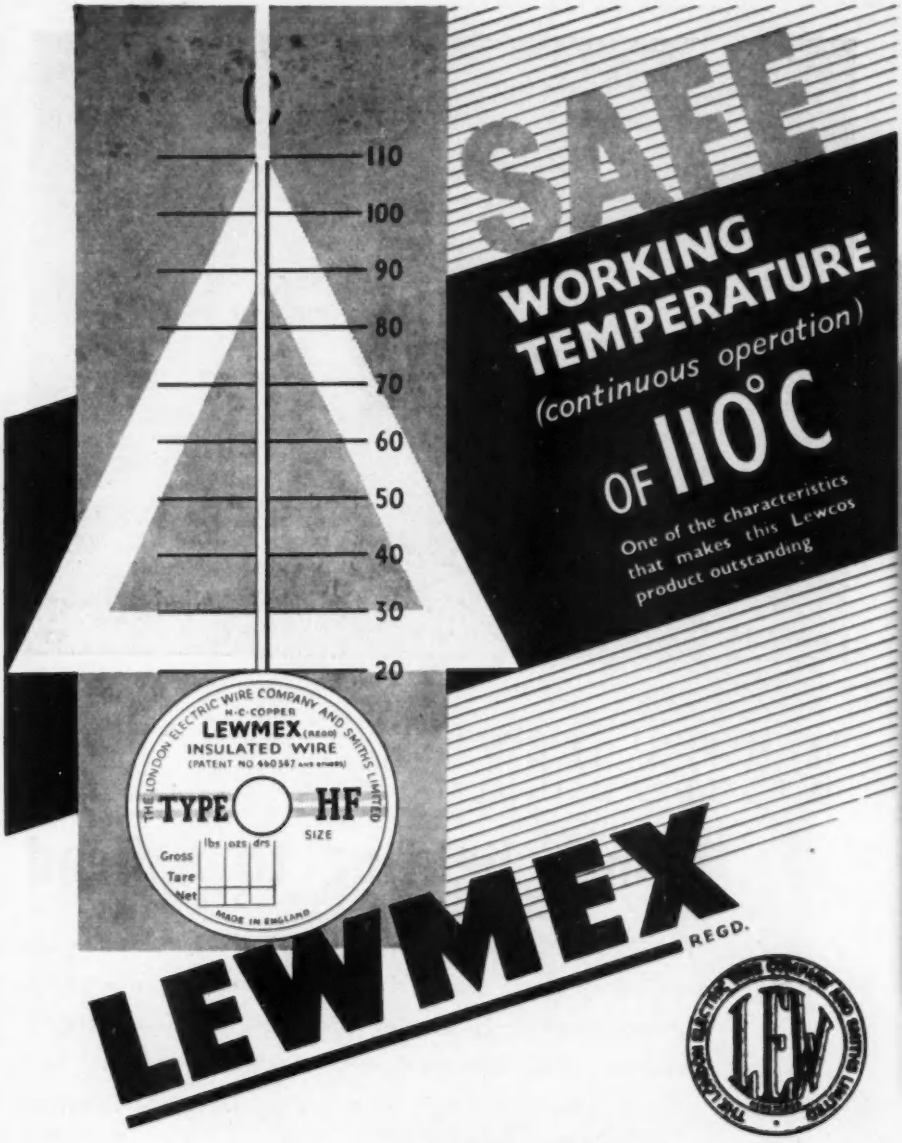
The products of The British Thomson-Houston Company enjoy an enviable world-wide reputation. Many factors have contributed to this position, such as excellence of design, robust construction, and consistency of quality, but of equal importance has been the careful study by BTH engineers of the requirements of particular industries. This applies especially to coal and metal mining. Since the beginning of the century BTH has been installing equipment in mines, and during the whole of this period has had free discussion and exchange of views with mining engineers the world over It has thus helped to overcome problems arising from the arduous conditions under which mining electrical apparatus has to operate The Company has very extensive research, design and manufacturing resources, and produces a most comprehensive range of apparatus for mining, above and below ground, from the largest winders to the smallest motors and lighting equipment It is, therefore, with the utmost confidence that the Company is taking a leading part in the supply of equipment for the schemes of reconstruction and modernization in progress not only in this country but in many other parts of the world.

. . . SPECIFY BTH EQUIPMENT

BRITISH THOMSON-HOUSTON

THE RUGBY · ENGLAND CO.LTD

A3925



SYNTHETIC ENAMEL

INSULATED WIRES & STRIPS

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS, LIMITED
LEYTON, LONDON, E.10.
Incorporating FREDERICK SMITH AND COMPANY
Associated with THE LIVERPOOL ELECTRIC CABLE CO., LTD., AND VACTITE WIRE CO., LTD.

'PERSPEX'

brings lighting to a head

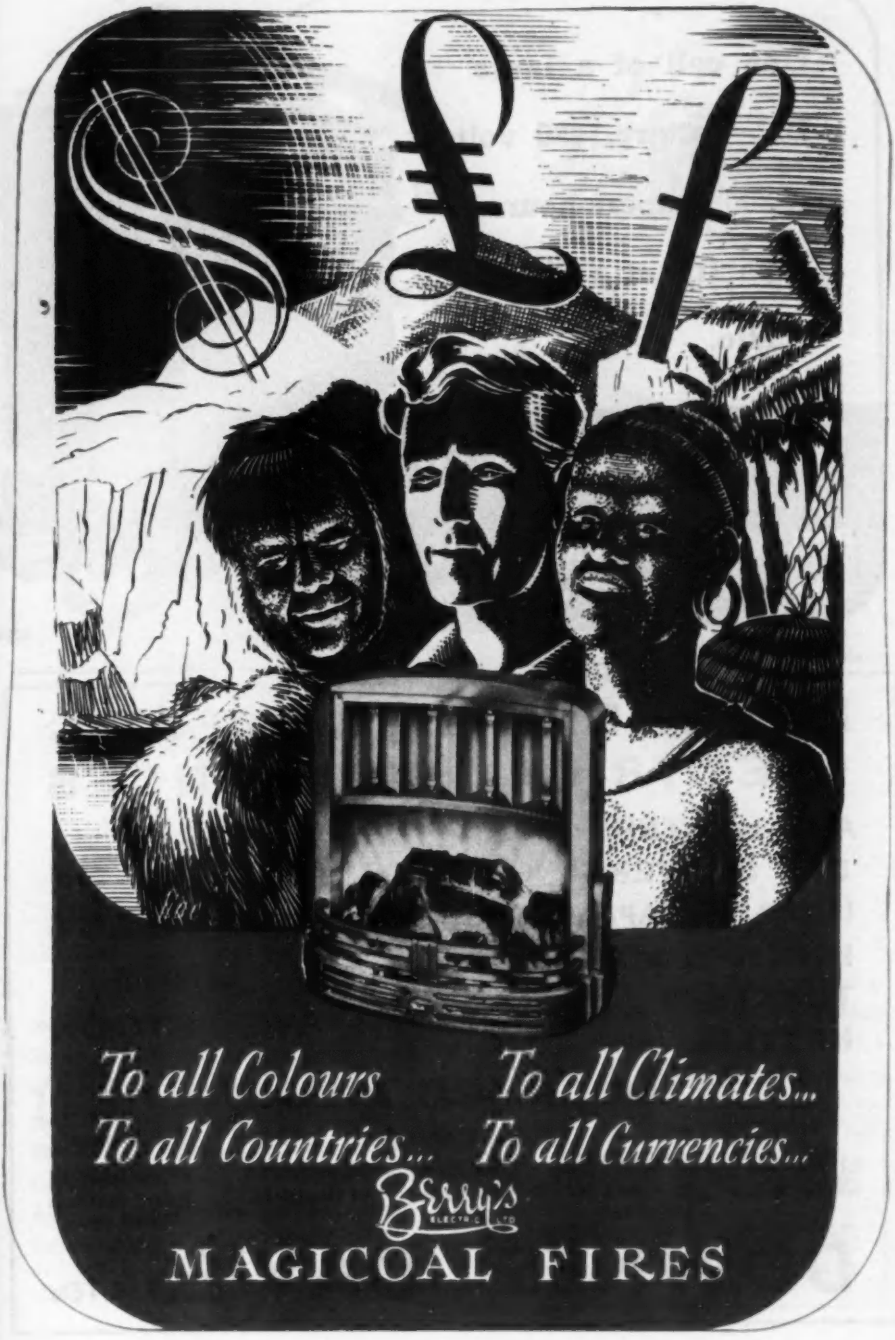
"Atlas" fluorescent lamp fittings with 'Perspex' reflectors, supplied by Thorn Electrical Industries Limited, provide even, diffused lighting. Outstanding properties of these 'Perspex' reflectors include efficient downward reflection combined with upward transmission of light, attractive appearance and durability.

'Perspex' is the registered trade mark of the acrylic sheet manufactured by I.C.I. Limited.

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON, S.W.1

ICI

P 358


To all Colours To all Climates...
To all Countries... To all Currencies...
Berry's
MAGICOAL FIRES

One cell of a large D.P. battery, 230 volts, 10,200 ampere-hours capacity, at a film studio.

THE D.P. BATTERY CO.
LIMITED
BAKEWELL DERBYSHIRE.
LONDON: 50 GROSVENOR GARDENS SW1.

J.206

DEPENDABLE DOMESTIC ELECTRICAL APPLIANCES

AIR HEATERS
DRY SHAVERS
INFRA RED APPARATUS
KITCHEN MIXERS
TOASTERS
KETTLES

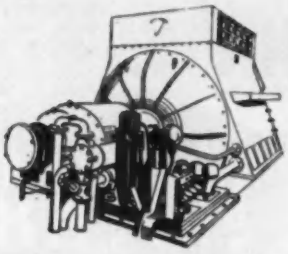
A FEW OF THE MANY LINES WE STOCK

WE HANDLE HIGH-CLASS APPLIANCES ONLY

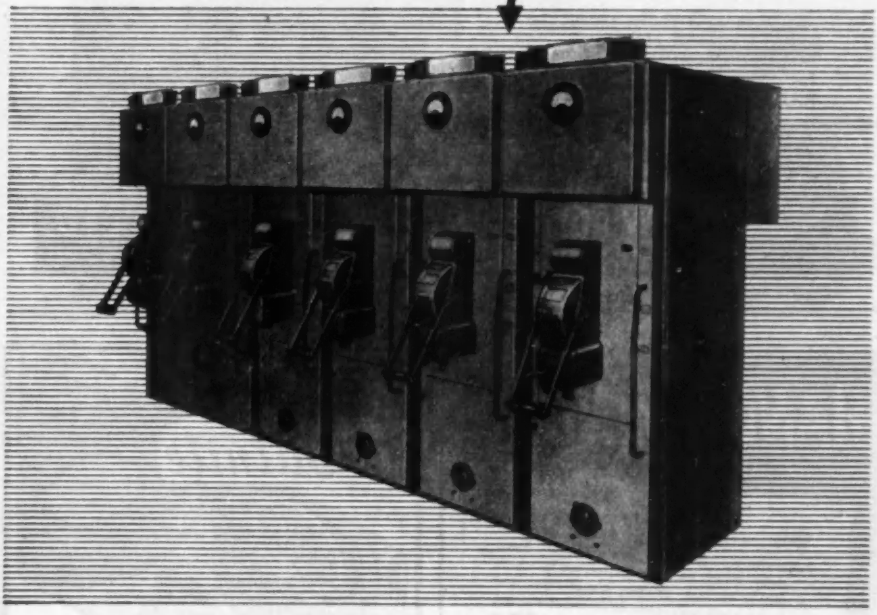
OUR ADDRESSES:

LIVERPOOL 1-9 Stanley St.
MANCHESTER 3a Norfolk St. Pall Mall
CARLISLE Paternoster Row
BIRKENHEAD 94 Chester St.
WORKINGTON Oxford Buildings Oxford Street

DOWNES & DAVIES LTD.



Because of this you know what this will do



The small picture shows the special alternator of the Short-Circuit Testing Station at the Crompton switchgear factory. Between this station and the design office a constant liaison exists. Designers put their theories to practical test at every stage in the evolution of a design. Then comes the final proving test to confirm the performance rating before certificates are issued by the Association of Short-Circuit Testing Authorities of which Crompton Parkinson Ltd. are members. As far as tests can prove anything Crompton switchgear is proved.

SWITCHGEAR—
ONE OF THE PRODUCTS OF THE PLANT DIVISION
Crompton Parkinson LIMITED
CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

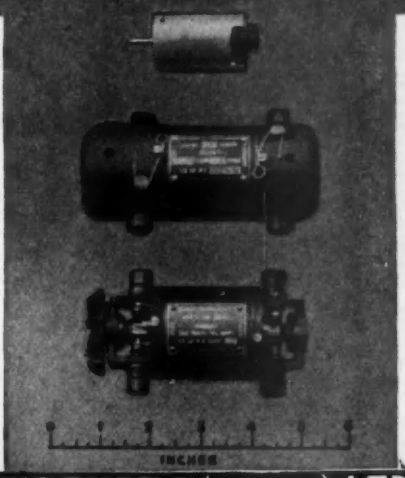
NEWTON-DERBY

LIGHTWEIGHT ELECTRICAL EQUIPMENT

Our manufactures include:

Aircraft Generators and Motors
Automatic Voltage Regulators
Rotary Transformers
High Frequency Alternators
H.T. D.C. Generators

The illustration shows a small high-speed fractional H.P. motor and miniature Rotary Transformers for "Walkie Talkie" and other RADIO applications.



SBAC

NEWTON BROTHERS (DERBY) LTD.

HEAD OFFICE & WORKS: ALFRETON ROAD, DERBY. TELEPHONE: 4286/7. TELEGRAMS: DYNAMO, DERBY
LONDON OFFICE: IMPERIAL BUILDINGS, 56 KINGSWAY, W.C.2

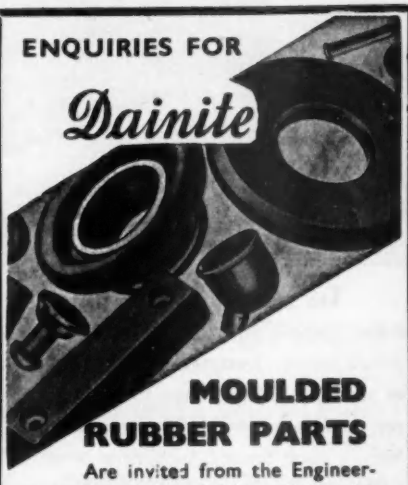
HANDS WANTED!

WHAT kind of hands? Skilled hands—nimble hands—above all, healthy hands. Keep a special watch on those processes in which insulating varnish, shellac, transformer and lubricating oils may result in dermatitis—that means hands that are lost to production. Where Rozalex barrier preparation is used, output is never endangered by dermatitis, or by the fear of dermatitis, which can be almost as crippling. Rozalex is simple to apply, and forgotten by the user when applied. There is a type of Rozalex to act as a barrier against almost every known industrial irritant. Our technical representative is at your service. Write to Rozalex Ltd., 10 Norfolk St., Manchester 2.

APPLY ROZALEX

ENQUIRIES FOR

Dainite



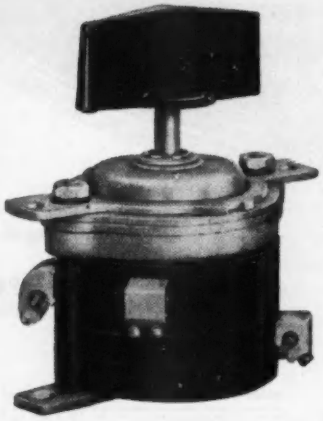
MOULDED RUBBER PARTS

Are invited from the Engineering, Electrical and Motor Industries for special Moulded Parts in Natural and Synthetic Compounds.

THE HARBORO RUBBER CO., LTD.
MARKET HARBOROUGH.

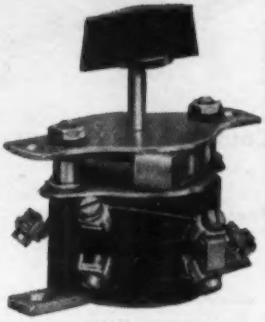
FOR SIMPLER SWITCHING...
SWITCH TO SANTON

TRADE MARK SANTON



SANTON LTD. have designed and made Rotary Switches for more than 5,000 different circuit requirements, and were the first to produce multi-circuit types in Great Britain.

Have you a switching problem? SANTON can solve it!



STURDY, COMPACT SANTON SWITCHES

- can be made to control an infinite variety of circuits.
- operate on a single rotary movement.
- have large, easily-accessible terminals, plainly marked.
- are available from 10-60 amps (180 under special conditions); any number of poles—up to six positions—up to 660 volts.
- are delivered promptly—and give years of trouble-free service.

Most areas have a Santon Resident Engineer who will be pleased to call and discuss your switching problems with you. Take the first step today towards simpler, more efficient control. Write or 'phone SANTON.

SANTON LTD

NEWPORT 16 - MON - Telephone 71211

15987A

ESTABLISHED 1878

ATTWATER & SONS

HOPWOOD STREET MILLS
PRESTON.

MICA & MICANITE

IN ALL FORMS & QUALITIES

BAKELITE SHEETS · TUBES · BOBBINS · VARNISH AND ROSIN
FOR OIL SWITCH GEAR & TRANSFORMERS

VULCANISED FIBRE SHEETS. TUBES AND RODS.

PEERLESS **LEATHEROID** INSULATION.

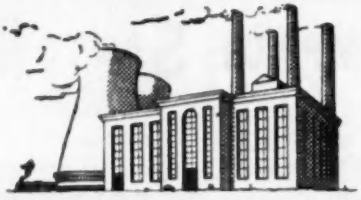
BAKELAQUE INSULATION
BEST BRITISH MANUFACTURE

Cotton and also Asbestos Dynamo Tapes.

Presspahn and Fullerboard In Sheets and Rolls.

Empire Cloth and Tapes.

Ebonite and all Insulating Material for Electrical Engineers.



PHOSPHOR BRONZE

for the Electrical Industry

In a range of alloys containing from 5% to 10% Tin

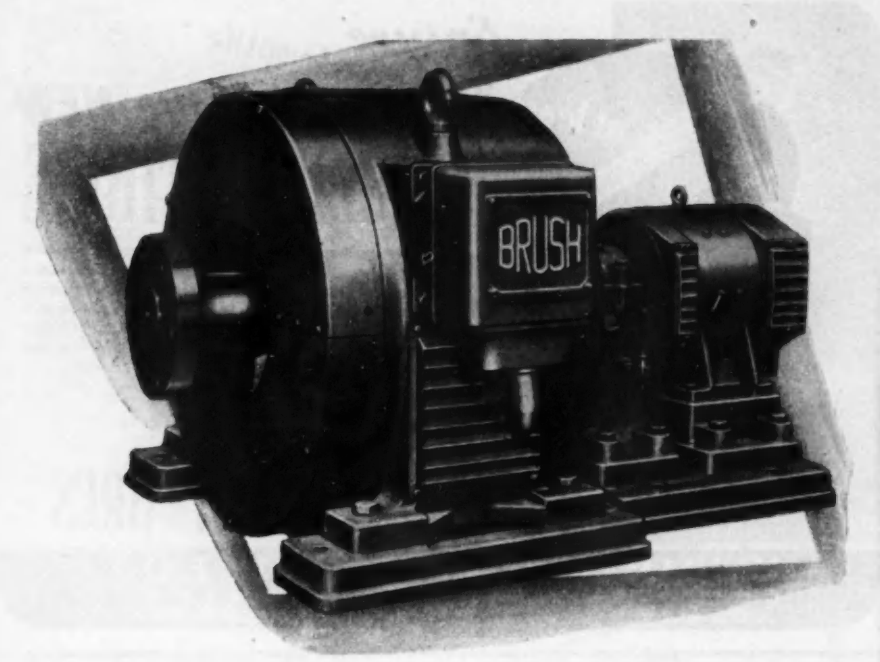
SHEET, STRIP, RODS, WIRE AND TUBE

To British Standard Specifications, or to customers' individual requirements.

CHARLES CLIFFORD & SON LTD., DOG POOL MILLS, BIRMINGHAM 30

AND FAZELEY ST. MILLS, BIRMINGHAM 5. OFFICES: LONDON, GLASGOW, MANCHESTER AND DUBLIN

W-W.17



BRUSH SALIENT POLE ALTERNATORS

25 kVA to 2,500 kVA PEDESTAL BEARING SERIES

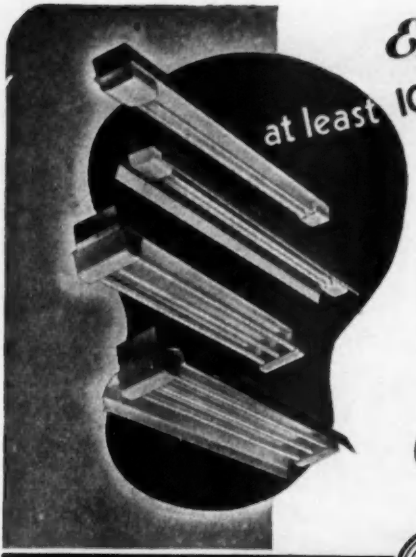
The extensive experience which this Company possesses in the construction of plant for electric generation is embodied in the design and construction of "Brush" Alternators. Many types of Alternators are available suitable for driving by all classes of prime movers.

Write for Publications Nos. 7/21021 and 7/21031.

THE BRUSH ELECTRICAL ENGINEERING COMPANY LIMITED • LOUGHBOROUGH • ENGLAND

BRANCHES: LONDON · BIRMINGHAM · CARDIFF · MANCHESTER · LEEDS · NEWCASTLE · GLASGOW

14.30



Ensure at least 100% Longer Lamp Life *with the* **NEW**

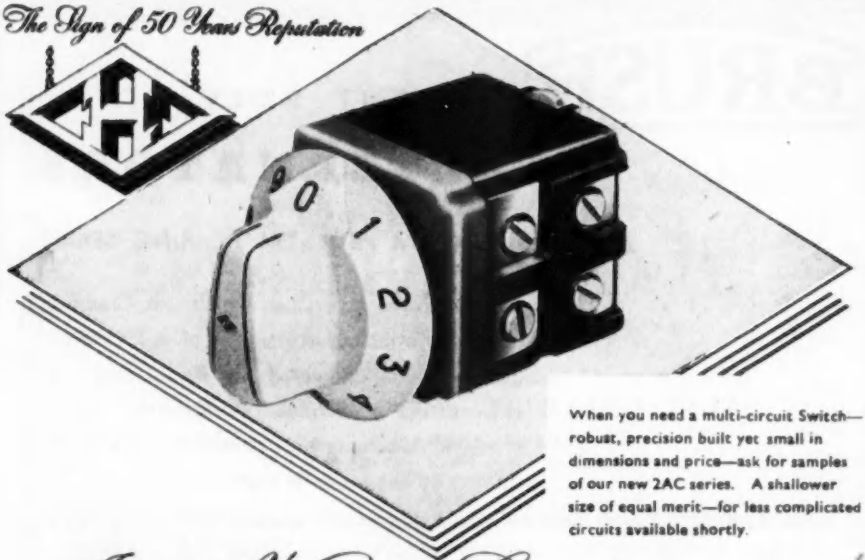
COLD CATHODE

These new Cold Cathode Lamps combine the advantages of instant starting, high efficiency and considerably longer life than has hitherto been available. Made in a variety of colours and combinations in single 10 ft. tubes, 5 ft. U-tubes and 3 ft. grid tubes. Write for full details of the Meico range of Cold Cathode Luminaires.

Meico COLD CATHODE LUMINAIRES

MICRAMATIC LIMITED
CONGLETON CHESHIRE
Scottish Sales Office: 73 Robertson St. Glasgow C2.

The Sign of 50 Years Reputation



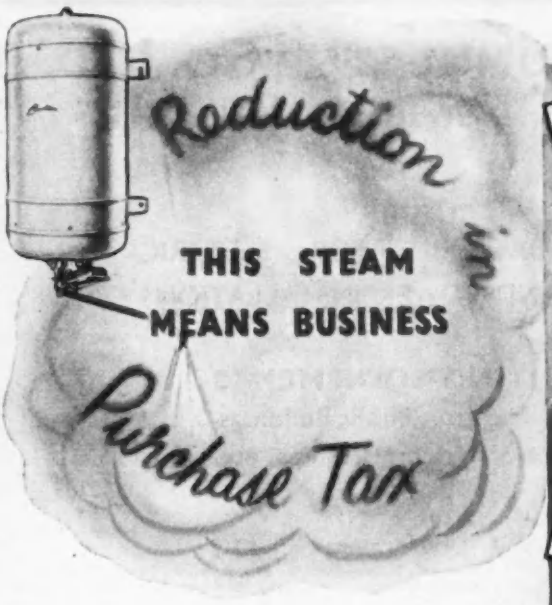
When you need a multi-circuit Switch—robust, precision built yet small in dimensions and price—ask for samples of our new 2AC series. A shallower size of equal merit—for less complicated circuits available shortly.

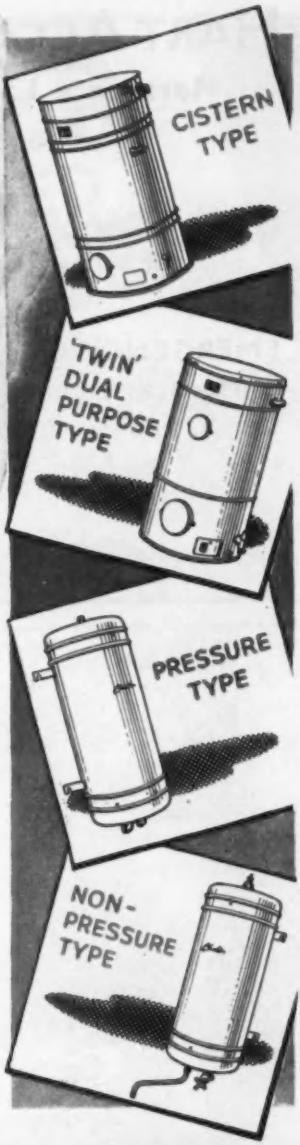
Another Valuable Contribution by –

"DIAMOND H" SWITCHES LTD.

Gunnersbury Avenue, London, W.4. *Phone: Chiswick 6444/6. Cable: Diamonhart, Chisk, London*

No.28





THE reduction in Purchase Tax will release some of the pent-up demand for B.N.E. *Charlton* Electric Water Heaters. Make sure you get your share of the business by ordering a range of these attractive and efficient heaters now—they are designed to meet every purpose and are available immediately from any B.N.E. depot* while stocks last.

**There is one at your nearest J. & P. Branch.*

A BNE Product

BRITISH NATIONAL ELECTRICS LTD.

The Domestic Appliances Section of JOHNSON & PHILLIPS LTD.
NEWARTHILL · MOTHERWELL · SCOTLAND.

HART ACCUMULATOR CO. LTD.,

Marshgate Lane, Stratford, London, E.15

Manufacturers of

STORAGE BATTERIES FOR ELECTRIC LIGHTING AND POWER INSTALLATIONS

EMERGENCY LIGHTING EQUIPMENTS
for Hospitals, Cinemas, Theatres, Public Buildings, Hotels, Business Premises, Factories, Ships, etc.

PRICES ON APPLICATION

BY APPOINTMENT TO H.M. THE KING MAKERS OF ACCUMULATORS

Telephones: MARyland 1361-3

Branches at Birmingham, Bristol, Cork, Dublin, Glasgow, Manchester, Newcastle-on-Tyne, Nottingham, and Westminster.

"Dunlow"
Electric Immersion Heaters for ALL kinds of liquids

Liquid heating is our business : not only routine heating for which we make many standard types of immersion heaters, but tricky, individual problems, which arise in industry, and elsewhere, from day to day. This has been our work for a lifetime and we invite you to put *your* problem to us. No matter what it is for, no matter how difficult it is—let us have it.

We thrive on difficulties.

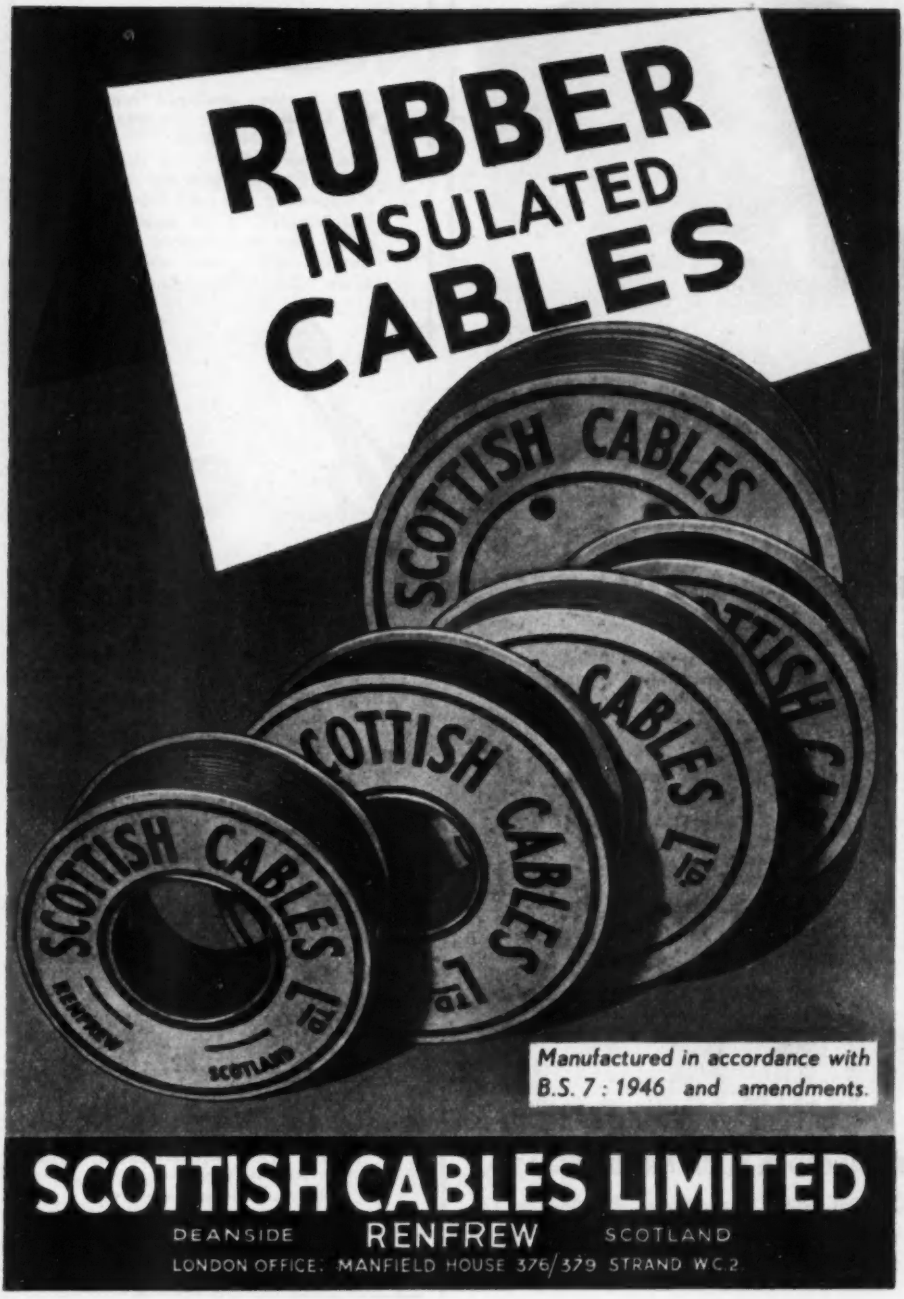
Literature on request—just give us an outline of your requirements.

DUNCAN LOW LIMITED

Managing Director:
DUNCAN W. LOW, B.Sc., A.R.T.C., M.I.E.E., A.M.I.C.E., M.I.B.A.E.

290 BELL ST., GLASGOW, C.4

Telephone: Bell 1961-2 *'Grams: 'Immerser, Glasgow'*


RUBBER
INSULATED
CABLES
SCOTTISH CABLES Ltd
RENFREW
SCOTLAND
Manufactured in accordance with
B.S. 7 : 1946 and amendments.
SCOTTISH CABLES LIMITED
DEANSIDE RENFREW SCOTLAND
LONDON OFFICE: MANFIELD HOUSE 376/379 STRAND W.C.2

PLASTIC MOULDINGS

Our new factory is equipped with the most modern plant for Compression, Transfer and Injection Mouldings, from moulds designed and manufactured in our own Toolroom.

Our complete insulation service also offers Mica and Micanite parts, heating elements, Bakelite and Micanite tubes, and fabricated parts.

R★M★P

RESINOID & MICA PRODUCTS LTD.

Colonial Works, Mary Street, Birmingham 12
Tel: Calthorpe 1303

3719A

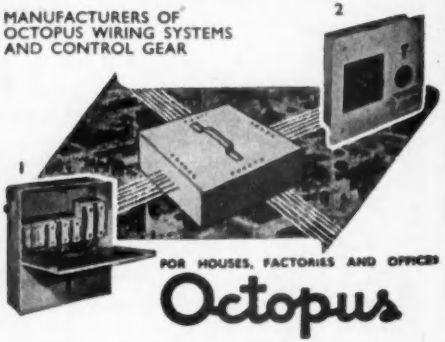
ES. 816

This is the catalogue number by which the outstanding "SANDSBURY" Consumers Electricity Control Unit is now generally known. Conforming to BS.1454, the "Sandsbury" is an example of what may be achieved by free development and experience allied to British Standards, as compared with the stilted and uniform patterns resulting from completely rigid specifications.

SANDERS
WEDNESBURY

WEDNESBURY · STAFFS · ENGLAND

MANUFACTURERS OF
OCTOPUS WIRING SYSTEMS
AND CONTROL GEAR



FOR HOUSES, FACTORIES AND OFFICES

Octopus

ensures speedier and more efficient installation. Considerable economy in labour and installation costs. *APPLICABLE TO ANY SYSTEM OF BUILDING.* Officially approved by governing authorities.

1. "Mains Control Gear," consisting of 30 amp. or 60 amp. D.P. Switch "Interlocked" "Single or Two-part Tariff."
2. "Cooker Control Units" Surface or Recessed Pattern. 30 amp. Pilot Lamp and Mechanical Indicator. 3 K.W. Auxiliary Circuit. Exceptional Maintenance Facilities.

Write for illustrated brochure to :

HARTLEY ELECTROMOTIVES LTD.
57 Victoria Street, London S.W.1

Sole Agents for Northern Ireland :
JAMES McCREEDY LTD., Private Rd., Cregagh, Belfast

HERE'S SOMETHING *which*

the housewives of your district are waiting to look into!

Catalogue No. 217

They have read the BURCO advertisements.

Some are experienced women who have used BURCO WASH BOILERS for many years and are anxious to investigate the even greater possibilities of the BURCO WASHING MACHINE.

Many are new wives who know the BURCO reputation, and foresee in this new model the means of avoiding washday drudgery.

All these are prospects for the live retailer who is prepared to show and demonstrate the BURCO Hand - Operated Electrically - Heated Washing Machine.

This popular-priced labour-saving washing machine has a dozen outstanding features. It will tackle a large family wash with ease, yet compacts into the minimum space between washdays. A point which especially appeals is that it HEATS OR BOILS THE WATER.

PRICE
£21.1.8
plus £5.16.0
Purchase Tax

THE Burco

HAND-OPERATED ELECTRICALLY-HEATED
WASHING MACHINE

Illustrated Folder, "THE BURCO STANDS TO REASON," from :—

BURCO LTD · ROSE GROVE · BURNLEY · LANCS

THAT EXTRA APPLIANCE-

Your Customer can have it

—WITHOUT EXTRA SOCKETS—

IF YOU GIVE HER

WYLEX

The Plugs and Sockets for

EXTRA CUSTOMER CONVENIENCE

Write for:

Explanatory Booklet of "Wylex" Dual Plugs.

GEORGE H. SCHOLES & CO. LTD.

WYLEX WORKS, WYTHENSHAWE, MANCHESTER.

BMS

We specialise in Light Pressings with rolled threads of all descriptions.

ROLLED THREAD LAMPHOLDERS

M.E.S. HOLDERS

Let us quote you. Highest quality work, good deliveries.

BAKER METAL STOPPER CO. LTD

HADLEY ST., KEY HILL, BIRMINGHAM, 18

Phone: Northern 3931-2

Grams: "Screwcap" Birmingham 18

Macdonald

ELEMENTARY ENGINEERING DESIGN

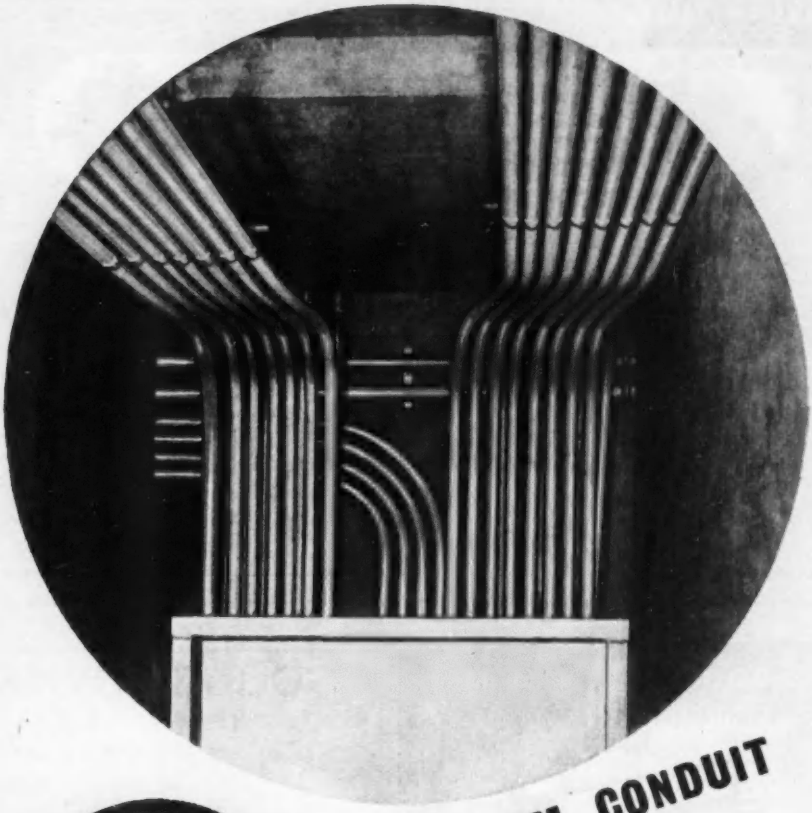
By H. A. MORGAN

Shows the student draughtsman how and where to apply his knowledge. Part I consists of completely worked-out examples of design, each illustrated by diagrams and a working scale drawing. Different sets of data are then given from which the student may design similar components. Part II consists of independent exercises in design calculation, graded in difficulty.

97 diagrams **15/-** *net.*

MACDONALD & CO. (Publishers) LTD.

43, LUDGATE HILL, LONDON, E.C.4



NORAL

ALUMINIUM CONDUIT

is competitive in price with other solid drawn conduits, and gives considerable saving in installation costs. Write for our brochure.

Northern Aluminium COMPANY LIMITED

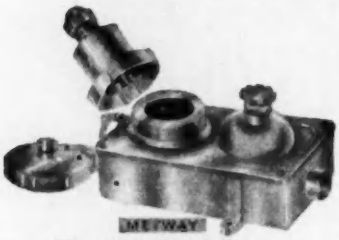
MAKERS OF NORAL SHEET, STRIP, PLATE, SECTIONS, TUBING, WIRE, FORGINGS, CASTINGS, PASTE FOR PAINT
TECHNICAL DEVELOPMENT DIVISION: BANBURY, OXON. *SALES OFFICES:* LONDON, BIRMINGHAM, MANCHESTER, BRISTOL, NEWCASTLE-ON-TYNE, LEEDS

METWAY PRODUCTS
Registered Trade Mark

WATERTIGHT SWITCHES. PLUGS AND SOCKETS.
SWITCH-PLUGS. CABLE COUPLINGS, ETC.
(5 and 15 amp.)

Watertight Switches
Standard type (as illus.). "Secret" type operated by key also available.

Watertight Plugs and Sockets
Accurately machined. Insulation is of best quality ebonite.



Watertight Switch Plugs.
W.T. Switches, Plugs and Sockets.

Watertight Cable Couplings
Precision casting in Zinc base alloy. Fitted with screwed locking rings.

WRITE FOR LIST No. AH.22/"T.E."

METWAY ELECTRICAL INDUSTRIES LTD.
KING STREET, BRIGHTON, 1
Phone: Brighton 8366. Grams: 'Metway,' Phone, Brighton

QUALITY PRODUCTS

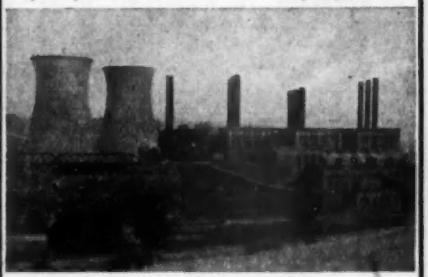
Send for Folder Covering Range

Made in Britain
SOLD THE WORLD OVER

B. & H. (NOTTM.) LTD.
POPHAM STREET, NOTTINGHAM
Telephone: 43826 Telegrams: "VOLTS" Nottm.
London Office: 67-69 CALEDONIAN RD., LONDON, N.1

COOLING TOWERS
OF DISTINCTIVE
DESIGN AND APPEARANCE
BY
THE DAVENPORT ENG. CO., LTD.

Towers shown below, one of which is under construction, are at a power station that has been enlarged beyond the river capacity from which it formerly operated.



HEAD OFFICE BRADFORD
Telegrams: Humidity Phone: 29361

POINTS TO REMEMBER
WHEN YOU BUY ELECTRIC MOTORS

Good, permanent electrical connections are essential to the efficient performance of an electric motor. Exceptional care is taken in the jointing of a BROOK motor . . as you can see from the illustration. Another feature of BROOK efforts to ensure electrical and mechanical supremacy.

Nearly fifty years of specialisation in Electric Motors from 0·25 to 200 H.P.

BROOK MOTORS LTD
EMPRESS WORKS
HUDDERSFIELD

I.HD.120

40 YEARS

MeLeSco

Achievement and Service

Our activities, extending over a period of forty years have been uninterruptedly devoted to the study and solution of problems associated with design, construction and operation of steam superheaters for all purposes.

The knowledge we have acquired and applied has not only pioneered and extended the use of steam at elevated temperatures but has done much to stimulate development in the art of steam generation.

Specialised experience, unique manufacturing resources and first-class engineering service have successfully achieved wide diversity of application in the power plant field and established a reputation of which we are justly proud and endeavour always to uphold.

That is why "MeLeSco" Superheaters are specified and so extensively employed for all operating conditions in water tube boilers of every well-known make.

The **SUPERHEATER** *Company Ltd*

The Authority on Superheated Steam

53 HAYMARKET, LONDON, S.W.1
Works: TRAFFORD PARK, MANCHESTER, 17

BA 40

METER BOARDS
SWITCH BLOCKS
SUNK SWITCH BOXES

- *FIRST CLASS WORK*
- *QUICK DELIVERIES*
- *COMPETITIVE PRICES*

WE INVITE YOUR ENQUIRIES

We have been making and supplying the Electrical Industry with the above Specialities for over 27 years

WOOTTON & CO. LTD.

ALMA WORKS, PONDERS END, MIDDX.
TELEPHONE: HOWARD 1858

USE "GUNFIRE"
TRADE MARK
Time Switches
AND
Process Timers
FOR SATISFACTION

AUTOMATIC LIGHT CONTROLLING CO. LTD., BOURNEMOUTH.

Established over Fifty Years.

MORE— —THAN
FIFTY YEARS

SPECIALISATION IN —
INSULATED ELECTRIC WIRES, CABLES & FLEXIBLE CORDS

The SAXONIA ELECTRICAL WIRE Co. Ltd
ROAN WORKS GREENWICH S.E.10
Phones Greenwich 0463 · 1672 ◆ Grams Saxonist London

Industrial

PLUGS AND SOCKETS

RANGE 5 TO 250 AMPERES

by **REYROLLE**

HEBBURN Co. DURHAM ENGLAND

Enquiries solicited by
ENGINEERING & LIGHTING EQUIPMENT CO. LTD.
SPHERE WORKS, ST. ALBANS, HERTS
Telegrams: VOLTARCON, ST. ALBANS *Telephone:* ST. ALBANS 2258/9

NEW *SMALL* PROCESS TIMERS
5¾" x 6" x 5¼"

For flush or wall mounting.
Type SRJ. Automatically Resetting Timer.
Type JPS. Hand Resetting Timer.
BOTH SYNCHRONOUS
SRJ. *Ask for Lists 120 & 121/E.T.*

LONDEX LTD
Manufacturers of Relays
207, ANERLEY RD., LONDON, S.E.20. SYDenham 6258-9

SEND YOUR HEATING PAD AND BLANKET SERVICE WORK TO US

7 DAY SERVICE *ALL MAKES*

● We are acknowledged experts in this work, having serviced over 20,000 appliances in the past few years. All makes accepted including Continental and American. There is no HEATING PAD or BLANKET which cannot be repaired by us.

MOLESEY 3432

THERMOLECTRICS LTD.
CHURCH ST. HAMPTON, MDDX.

Architectural Opal Lamps

NOW AVAILABLE!

WRITE FOR LEAFLET TO:—
LONGLAMPS LTD.
24, Marshalsea Road, London, S.E.1.
Telephone: HOP 1315-6

MINIMUM ORDER
12 LAMPS

IN.	30 MM.	40 MM.
12	13/-	18/6
24	20/-	28/-
36	25/-	37/6
48	32/-	45/-
19 11/16	18/-	25/6

Plus Purchase Tax.

A large range of motor driven, hand wound and electrically wound types is available including Solar Dial and Sunday "Cut Out" Device when required

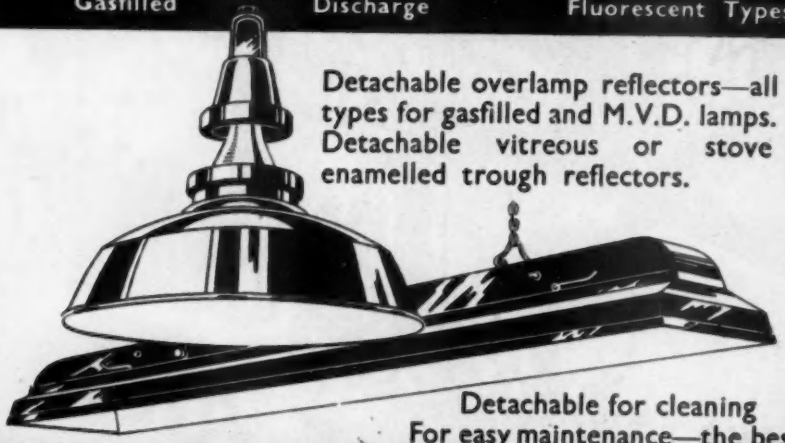
FULL DETAILS ON REQUEST.

VENNER TIME SWITCHES LIMITED

Kingston By-Pass Road, New Malden, Surrey.

Telephone: Malden 2442. Telegraphic Address: Clearwiches, Phone, Malden.

THORLUX INDUSTRIAL LIGHTING EQUIPMENT. Manufacturers of Gasfilled Discharge Fluorescent Types



Detachable overlamp reflectors—all types for gasfilled and M.V.D. lamps. Detachable vitreous or stove enamelled trough reflectors.

Detachable for cleaning
For easy maintenance—the best.

F. W. THORPE LTD. WELBY RD HALL GREEN **BIRMINGHAM 28**
SPRINGFIELD 3318 GRAMS: THORLUX B'HAM

BESTFREND
TUBULAR
SHEATHED ELEMENTS

Manufacturers and designers interested in Domestic or Industrial heating OF ANY DESCRIPTION assured of enthusiastic co-operation. Reliable elements of any shape or loading for any purpose.

The BESTFREND ELECTRICAL Co. Ltd.
Dicaland Wks. Banstead. Phone: Burgh Heath 1432

For new and used machine tools . . . power presses . . . sheet metal working and woodworking machinery, etc. . . .
F. J. EDWARDS, LIMITED, 359-61, *Euston Road, London, N.W.1. Tel: Euston 4681-3771. 'Grams: Bescotools Norwest London*

Autofeed SOLDERING IRON

Simple self-feed speeds up soldering. Better work. Saves solder. Write for interesting booklet—26 J

RUNBAKEN MANCHESTER 1

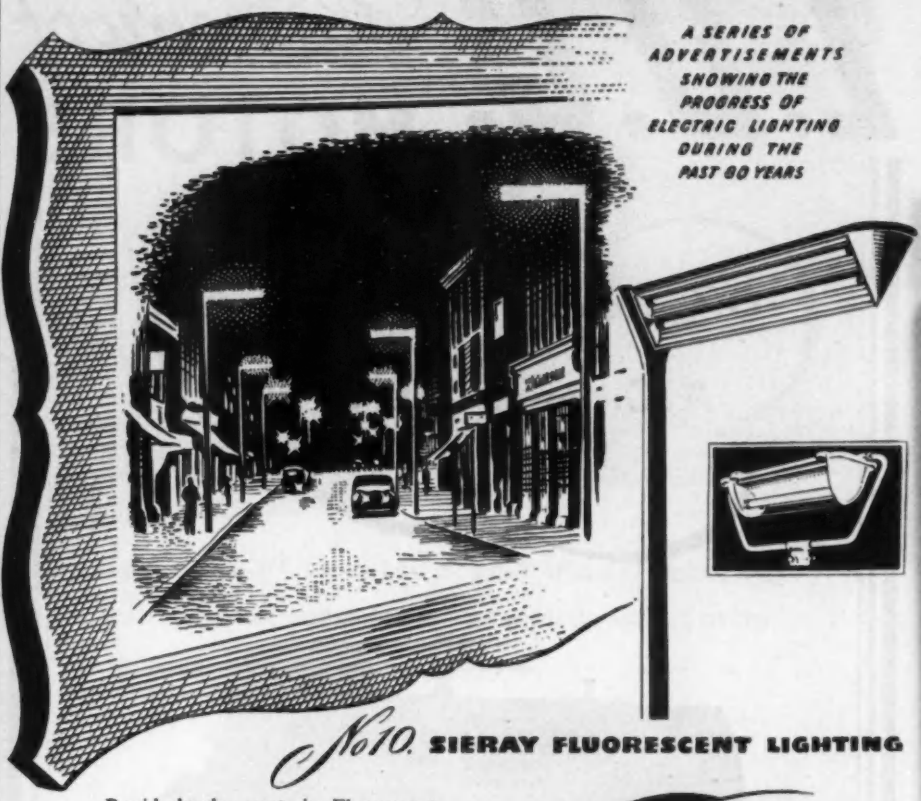
ALL CLASSES OF ELECTRICAL
REPAIRS
REWINDS

A.C. & D.C.
MOTORS
GENERATORS
RECONDITIONED
SWITCHGEAR
etc.
etc.

OLDFIELD ENGINEERING CO. LTD.
96 EAST ORDSALL LANE, SALFORD 5 BLA 3842-3 (2 lines)

ELECTRIC LIGHT... THE SIEMENS STORY

A SERIES OF ADVERTISEMENTS SHOWING THE PROGRESS OF ELECTRIC LIGHTING DURING THE PAST 80 YEARS



No 10. SIERAY FLUORESCENT LIGHTING

Rapid developments in Fluorescent Lighting have occurred since its introduction in this Country in 1940.

First marketed in 5-ft. lengths and in "Daylight" only, further colours "Warm White" and "Natural" and smaller sizes, *viz:* 4 ft., 3ft., 2 ft. and 18 in., have been added. Experiments were made as to its advantages for street lighting and for this purpose SIERAY Fluorescent Lamps and Lanterns have proved an unqualified success.

Our picture shows Fishergate, PRESTON, Lancs, lit by these lamps in "WILTON SIERAY" fittings. Street Lighting Lanterns are now made to accommodate 3-80w. SIERAY 5-ft. Tubes and a smaller size to take 2-20w. or 40w. 2-ft. Tubes.

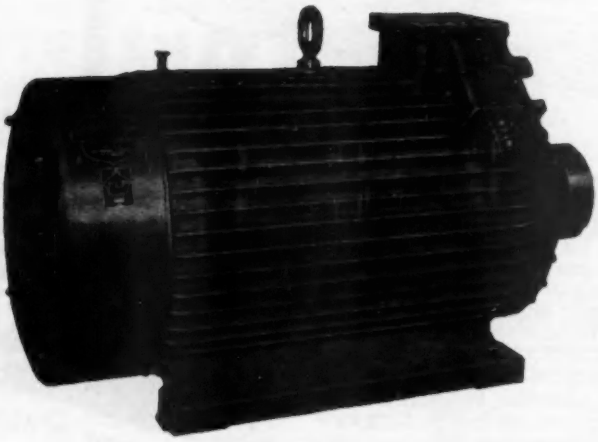
TO-DAY USE AND RECOMMEND SIEMENS LAMPS FOR LEADERSHIP IN MODERN LIGHTING

Advt. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C.4
Branches at Belfast, Birmingham, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Nottingham, Sheffield.

L.D.C. *Flameproof* MOTORS

D.C. up to 80 H.P.

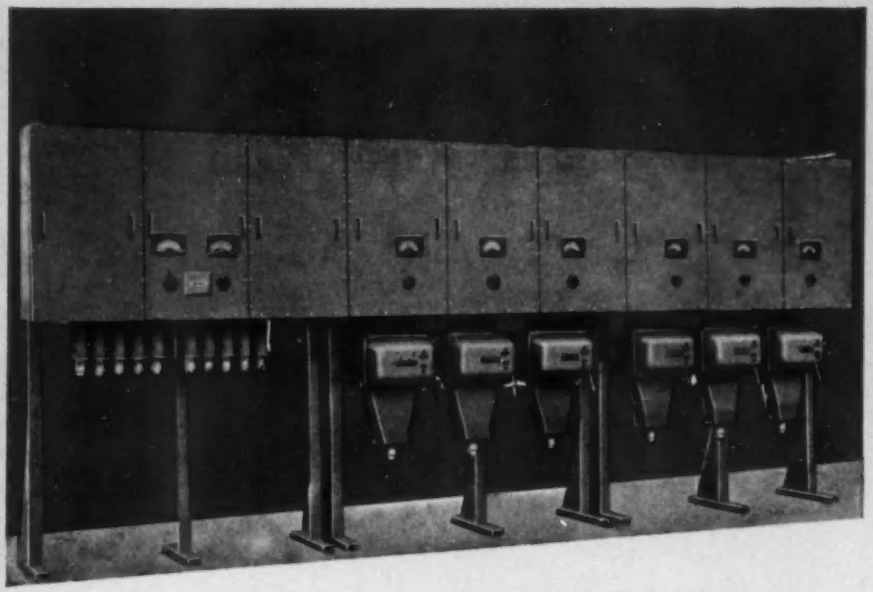
A.C. up to 1100 H.P.



LANCASHIRE DYNAMO & CRYPTO LTD

TRAFFORD PARK MANCHESTER 17 WILLESDEN LONDON N.W.10

Associated Companies:—Foster Transformers & Switchgear Ltd. . Crypto Ltd. Crypton Equipment Ltd.



For ease of addition and modification, flexibility of arrangement coupled with overall efficiency and durability ——

ONE WORD SUFFICES

Aeroflex
HOPE'S PATENTS

UNIT TYPE SWITCHBOARDS

PARMITER, HOPE & SUGDEN LIMITED

FLUVENT Electrical Works, Longsight, MANCHESTER 12

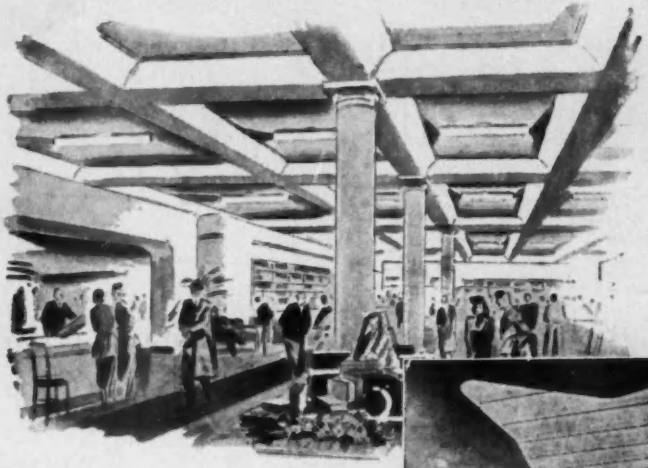
London: 34 Victoria St., S.W.1. Glasgow: 162 Buchanan St., C.1

dm PH 20

Brilliant Success of the new

"MAZDA-MELLOW"

Fluorescent Lamp



FIRST introduced on January 1st, the new and flattering "Mazda-Mellow" fluorescent lamp has been hailed everywhere as a brilliant triumph of BTH research. It is ideal for restaurants, clubs, showrooms and wherever people desire a warm, friendly atmosphere. It adds new charm to beauty, new luxury to furnishings, new delight to food and provides the perfect finishing touch to any scheme of interior decoration.

MAZDA

the outshining light

Made in England by B T H *Leaders in Lighting*

The new "Mazda-Mellow" fluorescent lamp is at present available in 5 ft. 80 watt size, price 15/6 plus P.T. 4/-. It is also available for use with instant-start gear, price 16/6 plus P.T. 4/3. For further details please write to the BTH Lighting Advisory Service, 44 Fitzroy Road, London, N.W.1. Tel: PRImrose 7181/5, or to the BTH District Office in your area.

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED
Crown House, Aldwych, London, W.C.2. Telephone: TEMple Bar 8040.

M4255

Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts., and published at Sardinia House, Sardinia Street, Kingsway, London, W.C.2. January 19, 1950